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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

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Observe, Compare, Reflect, Record.

VOL. III.

PHILADELPHIA:
SAMUEL S. WHITE, PUBLISHER,
528 ARCH STREET.
1862.

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CONTENTS OF VOL. III.

ORIGINAL COMMUNICATIONS.

PAGE
A CASE of Fracture of the Inferior Maxilla, and its Results ... 366
A Case of Irregularity of the Teeth .. 578
Alloys for Die Metal, etc ... 188
Alveolar Abscess ... 13
Alveolar Abscess ... 583
A New and Cheap Thermoscope ... 192
An Idea on Teeth ... 295
Anæsthesia and Anæsthetics ... 584
Arsenic ... 362
Arsenic ... 367
Arsenic ... 530
Arsenic ... 531
Arsenical Treatment of Diseased Teeth and Gums ... 467
Artificial Dentures ... 4
Atmospheric Pressure Plates ... 244
Atmospheric Pressure Plates ... 353
Decoloration of Teeth ... 234
Dental Dispensaries ... 364
Dental Fees ... 523
Dental Literature ... 191
Dentistry as a Profession ... 417
Discoloration of Dentine ... 57
Diseases of Teeth, their Causes and Treatment ... 641
Ether and Chloroform ... 367
Etiology of the Discoloration of the Teeth ... 133
Experimental Observations on the Action of Arsenious Acid on the Web of Frogs' Feet ... 580
Experiments in Vulcanizing Rubber Compounds ... 589
Filling Deciduous Teeth ... 409
Filling Deciduous Teeth ... 414
Foil Crimper for Adhesive Gold ... 534
PAGE
Fracture of the Inferior Maxilla, and its Results ... 592
Leeches ... 128, 184
"Life." — Does Being Imply the Right to Live? ... 180
Little Things ... 297, 532
Metallic Dies from Plaster Impressions ... 246
On Hardening and Tempering Instruments ... 299
Oxy-Chloride of Zinc ... 647
Oxy-Chloride of Zinc for Filling Teeth ... 6
Periodontitis ... 526
Plugging Teeth ... 418
Practical Hints... 1, 121, 177, 233, 289, 345, 465, 521, 577, 633
Professional Ethics ... 60
Professional Standing ... 290
Rationale of Tooth Discoloration ... 193
Reformation ... 238
Reformation ... 292
Review of Practical Hints ... 123
Review of Who are Dentists ... 9
Secretion ... 242
Soft Soldering ... 243
Solder from Gold Filings ... 469
The Cause and Progress of Caries .. 358
The Profession in England ... 301, 535
The Value of Statistical Information to the Dentist ... 420
Treatise upon the Genesis and Development of the Dental Follicles, etc ... 197, 248, 302, 347, 634
Vulcanite Work ... 470
"What Lack I Yet?" ... 136
Who will Answer? ... 470

PROCEEDINGS OF DENTAL SOCIETIES.

PAGE
Alumni of the Pennsylvania College of Dental Surgery ... 545
American Dental Association ... 658
American Dental Convention ... 62
American Dental Convention to be held at Trenton Falls, N. Y... 312, 656
Brooklyn Dental Association ... 657
Central Society of German Dentists .. 313
Dental Commencement ... 484
Gleanings from Proceedings of the New York City Dental Association ... 492, 602
PAGE
Michigan Dental Association ... 313, 444
Pennsylvania College of Dental Surgeons ... 262
Pennsylvania Association of Dental Surgeons ... 140, 257, 305, 368, 422, 471, 536, 593, 651
Society of Dental Surgeons of the City of New York ... 442

EDITORIAL.

PAGE
American Dental Association......... 666
American Dentistry in Europe....... 603
Arsenic........................ 266, 313, 382
Atmospheric Pressure Plates......... 477
Dental Associations...................... 496
Dentist to the Girard College......... 388
Dentistry and Medicine................. 202
Dentists in Military Hospitals......... 489
Dentists in the Army and Navy of the United States...................... 268
Dr. James Robinson 665
Gold Foil.................................... 658
Habits of the Beaver...................... 385
Hard Rubber Handles for Dental Instruments............................ 499
Human and Comparative Anatomy.. 384
Liabilities to Dentists 203
PAGE
Obituary—Carnie C. Franklin........ 667
Obituary—G. W. Shattuck, D.D.S.... 387
Our Visit to the American Dental Convention.................................. 91
Oxy-Chloride of Zinc............. 17, 495
Professional Jealousy 18
Publisher's Notice 667
Removal......... 93
Removal...................................... 205
Review of Practical Hints 149
Reviews............................... 269, 448
The American Dental Convention... 21
To Prevent Stones used for Sharpening Instruments from Clogging... 270
Treatment of Deciduous Teeth....... 546
Use and Abuse of Words... 548, 605, 659

REVIEW OF DENTAL LITERATURE AND ART.

PAGE
A New Substitute for Ivory, Horn, etc.. 557
Baron Larrey................................ 319
Bleaching..................................... 205
Brief Notices of some few Cases of Diseased Teeth, recently presented to the Museum of the Dental Hospital, Soho Square...................... 326
Chloroform in Dentistry......... 325, 560
College of Dentists of England...... 668
Croupy Inflammation in the Margin of the Gums, and its Effects....... 320
Edward Hudson............................ 93
Facial Neuralgia........................... 555
Filling Teeth................................. 99
Foreign Societies 553
Hippopotamus Teeth or Tusks........ 25
How Hunter Worked..................... 152
Hulliben's Scriptural Explanation of the Cause of Dental Caries......... 153
Important Hull Dentist Case 211
Lancing Gums.............................. 22
Management of Light.................... 608
Mesmerism.................................. 550
Muscles Concerned in the Depression of the Lower Jaw................ 150
New Applications of Vulcanized Rubber...................................... 613
PAGE
Nitrite of Amyl 558
Obituary—James Robinson, Esq...... 670
On a Case in which the fully-developed Crown of a Milk Tooth receded into the Jaw..................... 323
On Certain Conditions presented by Amalgams used in Filling Faulty Teeth 390, 500
On the Reddening of Teeth............ 213
Plugging Pliers............................ 552
Polishing Plates........................... 553
Porcelain Impression Cups............ 388
Practice of Hardening and Tempering Steel......................... 207, 270
Preservation of the Teeth.............. 319
Professional Jealousy 21
Refining, Alloying, and Working Gold.. 388
Review of Dr. J. H. McQuillen's Review of the Muscles Concerned in the Depression of the Lower Jaw.. 315
Sympathetic Irritation........... 156, 206
The Amalgam Question.......... 102, 154
The Application of Chemistry to Dentistry.................................. 609
Vulcanized Rubber for Artificial Teeth... 503
Who First Filled Nerve Cavities?... 556

SELECTIONS.

PAGE
The Gorilla 29

PERISCOPE OF MEDICAL AND GENERAL SCIENCE.

PAGE
A Case in which Artificial Teeth were lodged between the Tongue and Epiglottis.......................... 455
PAGE
Adulteration of Metals................. 173
Amalgams 513
A New Alloy................................ 629

PAGE
A New Silver Alloy 628
Annealing Temperature of Metals 679
Artificial Teeth in Pharynx 226
Cast of Teeth from a Syphilitic Child 397
Chemistry of Glass 574
Clastic Anatomy 685
Comparative Anatomy 115
Composition for Cleaning and Polishing Metals and Glass 687
Conservative Surgery 340
Cyst in the Antrum; Puncture on two Occasions; Cure 172
Dentine 505
Dentition and the Etiology of the Affections of the Respiratory Organs, Ear, and Eye 618
Dentition of the Adult Salmonidæ traced to Generic Type 449
Description of a New Fusible Alloy 629
Description of a Process for the Reduction of Silver from its Solutions 573
Development of the Dental Follicles and of the Teeth 619
Disinfection of the Breath 623
Empiricism 284
Etiological Relations of Dentition with Hip-joint Disease 405
Experiments with Kerosolene, and Cases of its successful Employment 457
Exsection of Nerve for Relief of Neuralgia 571
Extraordinary Ductility of the Bessemer Steel 517
Geological Changes in Teeth 565
Histology of Nerve Tissue 229
Illusions of Sensibility 341
India-Rubber 685
Indian Method of Fixing Loose Teeth 516
Influence of Habits in Modifying the Animal Organism 617
Influence of Occupation upon Health 336
Injurious Action of Iodine on the Teeth 573
Inodular Calcification 117
Irregular and Premature Decay of the Body 228
Irritation of Sensitive Nerve-fibres and Cells 229
Kerosolene 227
Lecture on Dentition and its Derangements 41, 108, 161, 217, 273, 328
Local Anæsthesia 403
Magnetic Electricity and Gold Amalgamation 284
Making Steel from Iron with Gas 516
Malformed Teeth 397
Malformed Teeth and Syphilitic Cachexia 169

PAGE
Monstrous Birth 630
Nævus situated upon the Inner Surface of Left Cheek; Excision 686
Necrosis of the Upper Jaw, and Death of a Child Six Weeks Old from the Emanations of Lucifer Matches 573
New Anæsthetics — Theory of their Action 49
New Composite Metal for Dies, Matrices, and Types 227
New Fusible Alloys: Remarks on Determining the Melting Point of Metals, etc 401
New Method of giving Chloroform 400
Nose bitten off and sewn on again; Teeth knocked out and reintroduced; Adjustment of a piece of detached Scalp 283
Nutrition of Bones 279
Odontological Society 572, 622
On a Previously Unobserved Preventable Cause of Idiocy, Imbecility, and the Allied Affections 111
On Certain Malformations of the Teeth in Congenital Syphilis 620
On Conservative Surgery 226
On Gold 514
On Mercury and its Relations to Dental Decay 224
On Passive Steel 338
On Physiognomical Diagnosis of Disease 569
On Platinum 230
On Poisoning of Watchmakers by Copper 404
On some of the Effects produced by the Retention of Carious Teeth in the Jaws 563
On Swallowing False Teeth 622
On the Antiseptic Properties of Ammonia 680
On the Condition of the Mouth of Idiots 458
On the Degeneration of Divided Nerves and the Various Degrees of Excitability exhibited by the Nervous System 221
On the Dentition as a Natural History Character, and as an Evidence of the Existence of a Type; certain but unknown 393
On the Elimination of Mercury from the System 280
On the Intermaxillary Bone and its Relations to Hare-lip and Cleft Palate 454
On the Means of Estimating the Value of Gilded and Silvered Articles 113
On the Natural Dissemination of Gold 172
On the New Physiological Properties Acquired by Divided Nerves 105

PAGE
On the Oxidation of Iron.............. 515
On the Preparation of Silicium...... 686
On the Properties of Liquid Carbonic Acid.............................. 53
On the Structure and Growth of the Tooth of Echinus...................... 338
On the Supposed Influence of the Cementum in Sustaining the Vitality of Transplanted Teeth....... 46
On the Tenacity of Metallic Cobalt.. 517
On the Variations of Excitability in all Living Tissues....... 168
Organic Development..................... 673
Origin of Pus................................ 405
Osteology and Dentition of the Natives of the Andaman Islands..... 511
Ovarian Cyst, containing Hair, Teeth, etc.................................. 517
Paraffine 629
Phosphor-Necrosis.................. 223, 674
Premaxillary Bone......................... 173
Preparing Caoutchouc for Dental Purposes...................................... 400
Preservation of Organic Structure for Microscopical Investigation... 517
Pressure in the Treatment of Cleft Palate.. 282
Progress of Science....................... 285
Properties of Metals....................... 566
Recent Researches on Metallic Amalgams, and on the Origin of their Chemical Properties.................. 683
Regeneration of Bone.................... 399
Remarks on Dentistry in the Army.. 51
Removal with Reproduction of the Inferior Maxillary, and Preservation of the Teeth 561
Report on the Alleged Deaths from the Inhalation of Sulphuric Ether. 283
Reunion of Dissevered Animal Structure...................................... 399
Root of a Canine Tooth lodged in the Thickness of the Lower Lip, simulating a Cancerous Tumor.... 686

PAGE
Salivary Fistula............................ 118
Salivation without the Administration of Mercury........................... 286
Simple Ulceration of the Tongue caused by a Sharp Tooth............ 286
Solidified Creosote......................... 405
Solubility of India-Rubber............ 573
Some Uses of Paraffin for Chemical Purposes 682
Standard of Health........................ 571
Staphyloraphy, etc......................... 53
Supposed Poisonous Action of Nitric Acid Fumes........................ 631
Sympathetic Action.............. 165, 625
The Action of Porous Bodies in Inducing Chemical Combinations.... 401
The Allotropic State....................... 337
The Antrum of Highmore and its Diseases......................... 277, 332
The Congress of German Dentists... 406
The Divisibility of Matter 677
The Expansion of Water not an Anomaly in the Solidification of Liquids 626
Theory of the Vertebrate Skull...... 342
The Physiognomical Muscles......... 572
The Physiognomy of the Syphilostrumous or Syphilitic Diathesis.. 620
The Physiology of Bone................ 117
The Science and Art of Metallurgy.. 627
The Sensory and Motor Functions of Nerves.................................... 281
The Sucking Apparatus of Infants.. 398
The Sulphuric Ether Patent........... 462
The Teeth in Inherited Syphilis...... 568
Tobacco 116
Ulcers on the Tip of the Tongue..... 626
Value of the Teeth in Determining the Anatomical Characteristics of Animals.. 509
MISCELLANY...... 54, 118, 173, 230, 287, 342, 407, 463, 518, 575, 631, 688
BIBLIOGRAPHICAL...... 56, 120, 176, 232 344, 520

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, AUGUST, 1861. No. 1.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Extracting Teeth.—In the course of our remarks from time to time, we have expressed surprise that there should be so much difference of opinion about the various modes of practice in a demonstrative science like ours; nevertheless, we feel it a duty to continue to write and communicate what we consider successful practice, even if it be objected to by those whose opinions we respect. Strange, that when we advocate the practice of lancing gums, to lessen pain and render the operation of extracting teeth more certain, we should be charged with inducing unnecessary suffering—the very thing which it is our aim to avoid! We have said, also, that we do not attempt to extract a tooth until *it is ready.* Now, except in some cases, from a neglect to lance the gums well and properly, or waiting until a tooth is in a proper condition to be extracted, a vast amount of pain is induced, and unsuccessful cases met with. If such cases do not occur to writers against the practice, they do most certainly happen to those less skilled in the art. If this be true, we advise the latter to adopt the more certain and successful method. We do not extract many teeth proportionately to our practice, because a great many patients are aware how much we are pressed for time, and do not wish to take the risk of being kept waiting, and therefore go to those whose time is not so much occupied. Besides, a number yet take ether or chloroform, or employ the galvanic battery, neither of which we use, and all that helps to reduce our opportunities of extracting teeth. We never have, nor is it our intention, to set up an argument against any one's practice; we write more to expose our own for the benefit of learners in our art, believing there are many in it, like ourselves, needing all the hints and instruction they can obtain from every source.

It will not be out of place to give a few cases which have occurred to us; nor are they few and far between. They show that the extraction of teeth is not as well understood as it should be, or such cases would not occur except among the inexperienced. Lancing the gums, in a great many cases, does not entail in the aggregate as much suffering as the failure of a single case without it. If a tooth be attempted to be extracted when the pulp is inflamed, or aching from inflammation of the external membranes, the subsequent suffering is much augmented by the injuries inflicted during the attempt at extraction. After due consideration, if the case does not present a favorable prospect of a successful termination, it is the duty of the dentist to endeavor to palliate the pain as much as in his power lies until the extraction is more certain and less painful. We do not hold it to be *modern dentistry*, except in rare cases, which the operator's better judgment will decide, to rush in *pell-mell* to cut, pry, gouge, and pull at a tooth, amid the shrieks and screams of an excited patient, as if he were catching a wild animal, simply because the subject might suffer an ordinary amount of prolonged pain. An educated surgeon does not operate until his diagnosis is favorable, no matter how much his patient suffers.

Case I.—A young gentleman, twenty years of age, was brought to us about six months since, from a neighboring town, with the right inferior first molar broken down to the gum. He was a very powerful young man, of the sanguine bilious temperament, bones hard and heavy. His gums were much bruised by the fulcrum of the key instrument. He was suffering great pain. We lanced the gums well, so that the flaps would yield to let the beaks of the forceps down. His teeth were not far out of the gums; their crowns were short, and the roots long. We also forced away as much of the margin of the socket as we could, placed the forceps on, and removed the tooth without difficulty. Now, if such a case had presented itself to us, we would have prepared it in this way before attempting to extract the tooth. This was the same day, and only about three hours after the unsuccessful attempt at extraction by his dentist. The difference of the failure and success here was solely due to the preparation of the case.

Case II.—A young lady of similar temperament and age as the case described above was sent to us by a surgeon, to get the right inferior second bicuspid extracted, on account of a fistulous opening under the base of the jaw. We lanced the gum in the usual way, and broke off the tooth in attempting to extract it; but it was not very strong. What was to be done? The bone was too hard to be cut away with a lancet, and yet it was necessary that the tooth should be removed. We first placed some nitrate of silver on the root, securing it there with cotton and a piece of cork between the adjoining teeth. This had the effect of destroying the gum to some extent, but the process was too slow. We next placed on the root arsenical paste, and secured it as described above. Of course it spread over the root into the gums, caused inflammation, absorption, and some sloughing. We repeated this once a week for four or five weeks, letting the inflammation subside between each application. The margin of the alveolus became denuded of the gum. We cut it away without pain, obtained a good hold of the root, and extracted it, apparently without pain.

When a fistulous opening exists outside of the face, the root of a tooth seems to be bound down in the socket more firmly than when the opening is in the gum; but the application to the parts of the paste loosens it up by inflaming and thickening the membranes, and detaches the root from its close and firm adaptation to the walls of the socket; hence the operation of extraction is much facilitated.

CASE III.—A gentleman, aged forty-five, who was sent to us from a neighboring city, had the right inferior first molar broken off. The anterior root was extracted by his dentist. The parts had been much injured by the operation. The tissues were irritable, very painful, and somewhat fungoid. The remaining root was very firm in its socket, the parts sensitive to the touch. We placed a piece of cotton in the wound, as the margins of the gums folded in, imbued it slightly with the arsenical paste, and told the patient to call in one week, which he did. We found that the sensitive and fungoid parts had sloughed away; there had been no pain since the paste was applied, and the root was found to have sprung from the socket. We reached down with a small but strong excavator, and removed the root without difficulty or pain. The patient remarked that such a case would injure the local reputation of the dentist.

CASE IV.—A child, aged nine years, was sent to us by a medical friend, with fistulous opening under the left jaw from the first inferior molar. It had been broken off even with the gum one year since, in attempting to extract it. The poor child cried, and exclaimed, "Don't put that sharp thing down my tooth." The mother explained to us that the dentist had hurt the child very much in attempting to extract the tooth, and the more the child screamed the more he persisted in attempting to extract it, so that it had caused her to weep if the name of dentist was mentioned; hence she called on her doctor. We found the roots quite firm and even with the gum, and no prospect of cutting it down to get hold, as the child was so very nervous and frightened from her former suffering. We secured a small portion of cotton between the free margin of the gum and the tooth, saturated with the paste, which in one day loosened the gum somewhat. We renewed the application every few days for about three weeks, until a considerable pledget of cotton could be retained between the roots and the gum on either side; this gave us sufficient room to place upon the roots the beaks of the forceps without lancing the gums, and the tooth was removed apparently without the slightest pain. The roots were not large, and not fully formed. Had this tooth been lanced well, it could have been extracted at first, as the roots were not large or strong. The breaking must have been the result of ignorance and inefficiency. Sometimes we make the slightest incision with a sharp lancet on either side of a root or tooth, and insert in it the arsenical paste or caustic, and in that way obtain space by degrees to hold more, as the case requires. This mode of practice may be new to some operators, and may be objected to because arsenic is *poison*. Whether it be or not, we hope we will not be condemned for succeeding in alleviating human suffering; nor will our preference for it prevent us from adopting a better way if it be suggested by any one in our profession. We ask for nothing but the shortest road to success, inflicting the least amount of pain, and rendering our practice effective and as free as possible from the appearance of *barbarity*.

ARTIFICIAL DENTURES.

BY H. MEREDITH WHITE, M.D.

THE plates of artificial dentures should not encroach upon the insertions or origins of the various muscles that are attached to either jaw, or are near enough to the alveolar processes to be liable to injury. Especially is this of importance when the plate is intended to occupy the whole of either jaw, as is the case in full sets.

A plate should not compress any of the ducts of the salivary glands.

All plates should be smoothly burnished, and press equably upon the parts they are destined to occupy. There are exceptions to the latter.

The edges of plates and bands should be rounded, so as to present an appearance like the side of a wire, and well burnished.

The sharp or rough edges of teeth ought to be whetted down and rendered smooth, to avoid injuring the tongue and cheeks.

It appears to me that there is not sufficient attention given to these points in making artificial dentures. If they were more attended to, there would be a saving of much inconvenience to both patient and practitioner. A dentist is often annoyed by a patient's dropping in every few days to get a little of the plate filed off, a little rough place burnished, or a sharp edge of an artificial tooth whetted down. Now the pain of the patient and annoyance to the dentist might be greatly reduced by the exercise of care in the beginning.

It is seldom possible for a plate to be in such a condition, when first introduced into the mouth, as to require no attention afterward; but that condition can be approached so as to occasion but little trouble in future.

It will be better, however, to consider a few of the prominent points somewhat in detail.

1st. The mucous membrane of the cheeks is continuous with that of the gums, and at their junction they seem to be less dense in structure than anywhere else, resting on a bed, so to speak, of loose areolar tissue and fat, and thrown into plicæ or folds, apparently to prevent rupture and undue distention; these appearances are present in both jaws. When a plate has been allowed to run down too far, some of these folds are cut across by the friction and pressure, causing very painful sores, and, if the irritation continues, are apt to degenerate into a low form of ulceration, which is difficult to subdue.

2d. The masseter muscle, on account of its origin and insertion, is liable to be interfered with. The insertion of this muscle sometimes extends far forward on the side of the lower jaw. In all cases, however, the plate should be retrenched at those points, and never allowed to interfere. I have seen a case in which a number of its fibres were cut across by a plate, terminating in a very painful and troublesome ulcer.

It is likewise necessary to keep the edge of the plate off the origins of the following muscles, viz.: the levator of the lower lip, the depressors of the angles of the mouth, the depressor of the upper lip, and also from those parts of the origin of the buccinator muscle near the alveolar process of the superior maxillary bone, and also from its origin on the lower jaw, which is on the "external oblique line of the inferior maxillary, as far forward as the second bicuspid tooth," (*Wilson's Anat.*)

The plate on the inside of the lower jaw should never run down far enough to come in contact with the muscles of the floor of the mouth.

3d. There should be no pressure on the ducts of Wharton, or on any of the numerous ducts of the sublingual glands. There is a case reported some time back, in which the dentist had considerable difficulty because the plate was allowed to compress some of these ducts, causing a temporary ranula, and giving much alarm to both patient and dentist.

4th. A plate should never be allowed to rest upon the frænum of the tongue, nor that of the upper or lower lip, since bruising or cutting them gives rise to painful ulcers.

5th. I have stated above that plates should press equably upon the parts they are destined to occupy; the following are some of the exceptions:—

If there are any painful prominences on the alveolar ridge, the corresponding prominences on the plaster cast should be built up a little with wax, so that when the metallic die is taken the plate may be struck up in such a manner as not to allow it to rest heavily on those parts when in the mouth and in "active service." In extracting teeth to make room for artificial dentures, if there is much unevenness of the alveolus, it is better to retrench the prominences with a heavy lancet or a small pair of bone nippers. It will save nature much time in getting rid of them, and the patient will suffer less discomfort in future. If, however, this was neglected when the teeth were extracted, there are two ways of procedure—they may be cut down upon and removed, or the corresponding points on the cast built up.

Behind the two superior central incisors there is a large papilla, which is directly over the foramen incisivum, through which pass blood-vessels and the branches of a nerve. Upon this a plate should never be allowed to press; it may give pain in a short time, but sooner or later it will cause such discomfort as to almost preclude the use of the plate.

The free edge of the plate outside of the alveolus of the upper jaw, and also of the lower jaw, should never fit accurately; if it does, the parts will be continually fretted, and render the use of the plate painful to the patient.

The plaster cast, at those parts mentioned, should always be built up smoothly with wax, about the thickness of card paper; there will then be comparatively little danger of irritation.

If the sockets of the teeth are not properly filled up, the depressions on the cast should be filled with wax, so as to make the under surface of the plate as uniform as possible, in order not to perpetuate the irregularities of the alveolar ridge.

PHILADELPHIA, July, 1861.

OXY-CHLORIDE OF ZINC FOR FILLING TEETH.

BY J. T. METCALF.

SOME eight or nine years ago, I read in the New York *Scientific American* a short paragraph copied from a foreign journal, to the effect that oxide of zinc became hard like stone on being mixed with a solution of chloride of zinc, and that the compound would be useful in filling teeth. The experiment was soon tried, and the result seemed at first promising; but my hopes were dashed by discovering that although not changed by pure water, the substance was rapidly decomposed by water slightly acidulated. This fact caused the abandonment of further experiments until 1859, when the large claims made for this material under various names again drew my attention to the subject. At that time, with the view of determining the proportions in which the materials should be combined to afford the best results, I instituted a series of experiments in the laboratory as well as at the operating chair, using various preparations, and speedily became convinced of the difference as to durability in the many sorts offered for sale. Of these, I do not propose to speak, but simply to give a method of preparing oxide of zinc so as to produce a dense filling, quick setting, and of fine texture.

But first I would consider the question of its applicability, as well as point to some cases in which it can always be better employed than any other known material. To do this fairly, it is necessary to bear in mind certain manifest imperfections inherent in the nature of the materials, and which it will be difficult perfectly to obviate.

1. *In most cases, if not in all, when exposed to the action of the fluids of the mouth, it is slowly dissolved.*—The necessary inference

consequently is, that it cannot be relied on for a permanent filling. Some fillings put in two years ago remain at this time as good as ever, while others with the same material and under apparently as favorable circumstances were washed out in half that period. Some on the grinding surfaces of molars, subject to the friction of mastication, remain perfect, while approximal and buccal cavities fail, and *vice versa*. This is the experience of all the dentists with whom I have conversed on the subject; and though it detracts from the usefulness of the filling, does not destroy it. "Half a loaf is better than no bread." Far better save a tooth for two or ten years than lose it without an effort. I know there are some who hold that a tooth which cannot be filled with gold had better be extracted at once. With much respect for the opinions of some of these gentlemen, I should differ from them. There are others for whom I have less respect, who will not use the filling under consideration because possibly it might compromise their reputations. But all who hold the interests and comfort of their patients as paramount, and seek with conscientious diligence such means and appliances as will contribute to these ends, will hail with good will whatever promises to be even of temporary utility.

But there are teeth in which oxy-chloride of zinc may be used with *permanent* advantage, and in which its peculiar qualities will commend it to all. I refer to those cases, generally molars, where the enamel remains, for the most part, sound, while the bone under it is extensively decomposed; the cavity running up into the cusps and having but little more sound dentine than enough to cover the nerve pulp. It is exceedingly difficult, if not impossible, to fill such a tooth with gold and make even a decently solid plug without cracking or splitting the enamel. The usual course is to break down the edge of the enamel, until it is found sufficiently strong to bear the pressure; the interior being freely exposed and accessible. This is undoubtedly the proper course when the tooth remains strong enough to admit of it. But in not a few cases the whole of the crown breaks away under such treatment, and the tooth is pronounced "too far gone" to fill.

With the help of oxy-chloride all these difficulties vanish. In such cases it is only necessary to make the external opening large enough to excavate all the decayed bone, making the edge clean and without sharp angles. Then, having protected the nerve with gutta-percha, or by evaporating collodion in the bottom of the cavity, or such other substance as may be found to answer as well, fill to the surface with oxy-chloride. When sufficiently hard, excavate to the edge of the enamel a suitable cavity with parallel sides for a gold plug, taking care to leave no particle above the edge of the cavity. This may be filled with gold and perfectly consolidated without the slightest risk. The oxy-chloride is thus protected from the action of the saliva, while it sustains and strengthens the tooth, making a permanent and beautiful operation.

Some fears have been expressed lest the caustic nature of the chloride of zinc might affect injuriously the bone of the tooth with which it comes in contact. I have examined many fillings with a view of determining this point, and have yet to find the first case where any perceptible deterioration of the bone could be justly attributed to the action of the filling. Where the filling remains sound, the bone will be found sound also.

2. *Contact of moist oxy-chloride with sensitive dentine causes pain more or less severe.*—By far the greater number of cases in which it is unquestionably useful, are dead teeth. The roots having been filled with gold, oxy-chloride is used to build up the crown and supply the lost bone. But cases not unfrequently present themselves like the following:—

A young lady called to have two lateral incisors filled. Approximal and posterior cavities had united to destroy a large part of the teeth, but leaving the front plates of enamel, including the cutting edges and sides, perfect, but so thin as to show distinctly the color of any substance under it. The nerve was not exposed, but the dentine over it exceedingly sensitive. After cutting away the thin edge and removing the decomposed bone, the shape of the cavity was such as to render a gold filling quite out of the question. The mere attempt would have split the tooth across. Obviously nothing could answer so well here as oxy-chloride of zinc. Its color, when seen through the enamel, was made to match the adjoining teeth, and its perfect adaptation and strong adhesion admirably fitted it for the case. The only drawback attending this operation was the *pain*, which was very severe during and for three hours after the filling was introduced. With the opposite lateral, which was in a similar condition, a drop of collodion evaporated over the nerve had the effect of mitigating the pain produced by the filling.

After fifteen months, these fillings remain good, but will doubtless have to be renewed some time hence. By using a solution of gutta-percha, collodion, or some protection of that character over the sensitive dentine, very much, if not all, the pain which sometimes attends the use of this material may be avoided.

3. *While in process of hardening, contact with water retards and arrests its induration.*—This is sometimes a serious obstacle in the way of a satisfactory operation, and occurs most frequently where the cavity runs down to or below the gum. Every care should be taken to keep the filling dry, by napkins, bibulous paper, wooden wedges, ligatures, or such means as may be applicable to the case, until the material hardens sufficiently to be but little injured by getting wet. I have made specimens which were hard enough to scratch marble five hours after being mixed; but if put into water ten minutes after being mixed, it will never acquire that density. By using a material which hardens quickly, good results may generally be reached.

I have instanced but a few circumstances under which I consider this filling peculiarly applicable; but from these it may readily be inferred what range it should take in careful practice. Wherever a good gold or tin filling may be used, plastic materials should be dispensed with, except, perhaps, where the speedy destruction of the tooth is anticipated from other causes.

Method of preparing oxide of zinc.—Triturate thoroughly in a mortar, refined borax, 1 part, by weight; quartz, 2 parts, and then add gradually 45 parts pure French zinc, white. When perfectly incorporated, calcine in a Hessian crucible, at a good red heat, for eight or ten minutes. This forms a *frit*, which, when cool, must be ground very fine, in small quantities, at once, together with trifling portions of coloring matter, such as yellow ochre and burnt umber, to impart the desired shade. To one part of the pulverized frit, add three parts, by weight, of calcined zinc, and combine thoroughly in a mortar. The powder is now ready for use, and should be bottled and stopped tight. That which is recently made, sets quicker and becomes harder than the old; consequently it is better to calcine but a small quantity at once.

The *solution* is made by dissolving one ounce of the dry salt chloride of zinc in six drachms of water. If made weaker, the paste requires a longer time to set, and is not so hard; if stronger, it attracts moisture from the air on exposure, proving that a part of the chloride remains uncombined. Sometimes borax has been dissolved in the solution, but without improving it.

A cheap imitation of one of the expensive and popular brands extensively in use may be made by mixing one part powdered junk bottle with three of zinc, and dissolving some borax in a solution of chloride of zinc. Oxides of lead and tin, which are also used to some extent, are by no means safe agents to put in the mouth, and should never be employed.

NEW HAVEN, July, 1861.

REVIEW OF WHO ARE DENTISTS.

BY J. ALLEN.

IN all branches of science or art, facts should be chronicled and error discarded. With this view we deem it proper to notice some of the errors in a series of articles recently published in the *Dental Register of the West*, and republished in other dental journals, under the head of "Who are Dentists?" by Dr. Wm. A. Pease. He tells us that

"Dentistry, as a profession, is of American origin. It had its rise in a great public want which nowhere but in the United States existed, and there is little likelihood that it ever will exist in any other country."

The idea here conveyed is, that teeth do not decay except in America. This is an egregious error. But he adds:—

"The want that gave it birth gave it also a vigorous growth, unexampled in any other profession—for *dentistry* cannot truly be said to date back much earlier than 1840. The Baltimore College had just been established, and it was thought that, by scientific investigation, means would soon be found to preserve the natural teeth, and thus greatly diminish, if not entirely dispense with the necessity of artificial substitutes."

Now if the doctor will look at the history of dentistry he will be able to trace it back more than 400 B.C. Hippocrates and Herodotus were among the Greek writers upon this subject; and from among the Romans we have also the writings of Pliny, Martial, Horace, Celsus, and others, which reflect much light upon this subject. And although as a science it was then in a rude state, yet Herodotus informs us that dentistry was practiced in Egypt as a distinct branch of surgery at that time; and corroborating evidences now exist in the fact that good gold fillings have been recently found in the teeth of mummies, which must have been inserted more than two thousand years ago.

Hippocrates informs us that the loss of the natural teeth was supplied with those of artificial, made of bone or ivory, and also human teeth, secured in the mouth by means of ligatures made of flax, silk, gold, or silver wire, attached to other remaining teeth in the mouth. About one hundred and fifty years after Christ, Galen wrote a much better work upon this subject than any of his predecessors, yet very little advancement had been made during the previous five hundred years. During the next fourteen hundred years, various authors wrote upon this subject, among whom were Ætius, Phaxes, Albucasis, Eustachius, and others. In 1579, Pakie, a celebrated French surgeon, wrote a very correct treatise upon the teeth. He enjoyed a great reputation, and was appointed surgeon in ordinary to Henry II., which office he held under three succeeding kings. French and English dentists had acquired celebrity in their native countries long before the Americans could claim supremacy in this branch of surgery, and we are much indebted to them for the light they have reflected upon our pathway in this department of science. From the writings of Eustachius, Hunter, Blake, Fox, Bell, Keocker, Leforgue, Duval, Leroy, and others, we have culled the basis of our profession; and Americans have done much, it is true, to elevate dental science, and a just tribute is now accorded to them by the Europeans, as well as those of our own country, for it. But to say that dentistry *originated* here in the United States, is a false assumption that should not be handed down to posterity in our dental records of the present era. No; the practice of dentistry was first introduced in the United States by Lemair, of the French forces, which joined our army during the revolutionary war in 1778, after which he resumed his practice in this country. Mr. John Greenwood was the first American dentist and he established himself in the City of New York more than forty years ago.

But Dr. Pease tells us that, soon after the establishment of the Baltimore College, "there followed an active course of experiments and investigations, to determine how far plugs would protect the teeth from further decay. Many of these experiments were necessarily imperfect and ill directed; and it soon became obvious that people had more confidence in mechanical than *conservative* dentistry, and neglected their teeth. This neglect was ruinous. At last, in 1854, (it is well to be particular about dates,) a rational theory was promulgated for preventing ulceration and curing ulcerated teeth, and about the same time, as if to fix and make that the initial point for the *advent of dentistry as a profession*, several improvements were made in preparing gold for dental purposes, that enabled dentists to make much more dense and durable fillings, and also to build up and restore the form of broken teeth. *The dental profession was then fairly established.*" "In theory, at least, there was no longer any or but little need of *mechanics* or manufacturers of artificial sets of teeth."

Well might the dental profession then exclaim, "Eureka, Eureka!" The darkness which had so long obscured dentistry at last broke away, and the sun of dental science then dawned upon this our happy land, where it nowhere else could shine. This great effulgence of light has revealed the principles by which a tooth can be plugged and an ulcer cured. Dentistry is now fairly established, says the doctor, and this is the sum total of what constitutes a dentist according to his definition. He seems to have waked up and fully appreciates the importance of these great principles, compared with which the mechanic (as he calls him who inserts artificial dentures) sinks into insignificance, and his vocation is gone forever; for Dr. Pease says: "Now, after more than six years' practice of the new method of treating diseased teeth, dentists feel warranted in saying to their patients there is no necessity for losing your teeth." Again, he says: "Teeth can be so thoroughly plugged that it will be as difficult to remove the plug, as it would be to cut away a corresponding portion of the tooth. Even in those complicated cases where the tooth aches, where there is a swelling of the face, a gum-boil, or a discharge of pus, the pain can still be quieted and the ulcer healed."

No constitutional diathesis or difference in cases are referred to as presenting any exceptions in this new mode of practice, but the reader is left to infer that it is infalible in *all* cases, and yet he tells us on page 282, *Dental Register*, "Never warrant your operations for a day; make your plugs *stick*, but do not warrant them to do so."

If this announcement had been made to the world one hundred years ago, and teeth could then have been preserved as the doctor says they now can be, the following law against obtaining husbands under false pretenses, passed by the English Parliament in 1770, would have been unnecessary, so far as the teeth are concerned.

This law reads thus: "That all women of whatever age, rank, profession or degree—whether virgins, maids, or widows—who shall, after this act, impose upon, seduce, and betray into matrimony any of his majesty's male subjects, by virtue of scents, paints, cosmetic washes, artificial teeth, false hair, Spanish wool, iron stays or bolstered hips, shall incur the penalty of the law now in force against witchcraft and like misdemeanors, and the marriage under such circumstances, upon conviction of the offending party, shall be null and void." But this is digressing.

Dr. Pease says "there are two classes of dentists, or rather, there are dentists and mechanics, from whom very different treatment may be expected. The one, basing their practice on a knowledge of the human system and the laws that govern it, will preserve the natural teeth; they will refuse to extract them, merely because they ache, or there is a gum-boil at the roots." And he further adds, "the patients of the first preserve their teeth."

Then why do they ache and have gum-boils? The skillful physician and surgeon also base their practice upon their knowledge of the human system, but they do not always preserve life and limb. No! it is their knowledge of the human system and of the laws that govern it, that forbids their making such unqualified assertions. It is the empirical who *say* they can always cure the sick, lame, and blind, under all circumstances.

The patrons of the other class, says the doctor, "get a shining set of white teeth, which every one knows to be artificial, in return for which they are but imperfectly cherished; the breath becomes offensive, the mouth falls in, the nose sticks further out, the lips shorten, the lips and cheeks become wrinkled and shriveled, the cheek bones assume an unnatural prominence, and they look prematurely old. The one, feeling little more responsibility resting upon them than what is common to mechanics, act accordingly; they persistently seek for a sale of their wares, talk loudly, and promise much; they obtrusively thrust forward their mechanical contrivances, and press pieces of artificial teeth on the attention of the public,—all of which the other as studiously avoids. The one never rises above the customs of a craft or trade; the other is governed by the rules of a profession."

Now although there may be some to whom the above remarks might be applied with truth, yet to speak thus disparagingly of all who construct artificial dentures (and he makes no exceptions) evinces one of two things—either that the position he occupies in the profession is unfavorable to command a full view of it, or his zeal to eulogize one branch of dentistry at the expense of another has warped his better judgment.

If the doctor will change his stand-point to one a little more elevated, he will be able to see some dentists at least (in the distance if not in his vicinity) who not only plug teeth and cure ulcers, but also insert artificial teeth, which, in point of appearance, are true to nature, and perform all the functions for which they were designed, as well as contributing largely to the comfort and gratification of their patients. But the graphic description of artificial teeth given by Dr. Pease, as above, is evidently from his own practical knowledge of what they are, how they are made, and the final result. When we review his three main points: First, that dentistry as a profession originated in this country, and that "it had its rise in a great public want which nowhere but in the United States existed, and there is little likelihood that it ever will exist in any other country;" second, that the province or legitimate sphere of dentists is limited to plugging teeth and curing ulcers at the roots; and, third, that those who insert artificial teeth are mere mechanics, nothing more,—we are at a loss to define the stand-point from which he views the subject, and the more so, because we have known the doctor for several years, and believe him to be truthful and writes what he conceives to be correct, and although we differ with him on the above points, still he has our respect and esteem.

NEW YORK, July, 1861.

(To be continued.)

ALVEOLAR ABSCESS.

BY W. H. ATKINSON, M.D.

ABSCESS—from the Latin *ab* and *cedo*, to go from; hence separation of tissue between which *pus* is interposed. This may be in various stages of formation, progression, or regression, which constitute the *stages* and *degrees* of the abscess, which so much complicate and render it difficult of diagnosis.

Abscess may be either acute or chronic, idiopathic or symptomatic.

The *acute* form obtains in vigorous systems; the *chronic* in the lax tissues of systems usually denominated scrofulous.

These varieties have many degrees, the dividing line of which is not well defined at first view.

Idiopathic, display themselves at the seat of localized inflammation.

Symptomatic, at a foreign place, and are the result of what is termed metastasis of the inflammation upon which they depend. And as abscess cannot exist without this process, it is well to understand the doctrines pertaining thereto, which, however, are too important and extensive to be entered into in this place, further than to state that density of structures very materially modify the inflammatory process, as to intensity and rapidity.

Alveolar abscess, then, will be the occurrence of the above described conditions in or on the alveolus.

Much confusion and ambiguity in writing and speaking is very apparent when this subject is under discussion, mainly arising from a want of proper nomenclature, some of the confused ones say; in consequence of which let us examine the premises, and see whether looseness pertains to the nomenclature, or the carelessness and ignorance of speakers and writers. So far as correctness of definition, or useful instruction to be derived therefrom, is involved, Harris had better have left the word without definition. It is evident, upon the reading of it, that no distinction is made between abscess arising in soft parts, or within the duplicatures of denser tissues—periosteum and bone; hence gum-boils and alveolar abscesses are synonyms with him.

Now, if this acknowledged head and leader in the doctrines and practices of our specialty is so hopelessly ignorant of a subject of so much importance to the well-being of our patients as to assert that "the only treatment that can be successful is preventive rather than curative, extraction being the lone example of the latter," what marvel if the masses deny the curableness of alveolar abscess! The rule is to deny it, and some have testified on the witness-stand that it was hopeless when once really present, and, a-la-Harris, at once swept all treatment other than extraction from their field of practice, and tried to frown down the efforts of others whose success have finally converted them, and made them desirous of being regarded as "in" on the side of *curability;* and would now gladly hide from their former ignorance displayed when testifying upon a subject they were supposed to understand, which experience proves they as yet knew nothing about. Alveolar abscess has often arisen, progressed, been arrested, and dispersed without ever having been suspected by the patient or practitioner; sometimes leaving a blackened tooth, as a sure testimony that it had been there—a dissection of which will prove it to the most obtuse, as has often been seen when looking for other items.

True alveolar abscesses and gum-boil may exist, separate or combined; and that they may be recognized, all that is necessary is close, intelligent scrutiny.

Gum-boil involves soft tissues only, and does not penetrate the periosteum, nor, alone, cause the death of the pulp.

Alveolar abscess always arises beneath periosteum, and hence has three localities, from which it may arise in the alveolus of every tooth, viz.: 1, from the external periosteum of the alveolar plate; 2, the internal periosteum of this plate, constituting the socket or alveolus proper; and, 3, the peridental membrane, or periosteum of the tooth proper. The first and second instances seldom compromise the life of the pulp, the third very generally has the effect to cause its death; though there are not wanting instances of its occurrence without producing death of the pulp. Gum-boil, therefore, is but a simple superficial phlegmon, and is not even remotely dangerous; while alveolar abscess is always deep seated, generally painful, and destructive in tendency to pulp, process, and tooth; and in bad constitutions is, at times, the inception of malignant disease.

Then to the question, 1. Does it exist? I unhesitatingly answer yes; in all degrees and in all stages, from the slightest separation of tissues to the most complicated, voluminous and distressing forms—fully to point out and explain which would consume too much time, and fill many volumes of close and tersely written matter. For to understand this involves the necessity of understanding the whole range of fact and phenomenon in anatomy, physiology, and pathology.

2. Can it be cured? Ans. Yes.

3. Has it been cured? Ans. Yes.

4. When may we abandon the hope of cure? Ans. When occurring in broken-down and "*blas*" constitutions.

5. After once having been cured, what are the liabilities to recurrence? Ans. The same as the liabilities to original formation.

6. How far gone in periosteal disease must a case be before it is hopeless? Ans. In good constitutions almost any degree of disease, short of entire suppuration throughout the extent of periosteal connections, may be resisted. In poor constitutions slight degrees result disastrously.

As to recurrence, a *soluble* state of the tissues is the most frequent immediate cause; especially if it take place before perfect calcification of the new deposit has been effected.

This state (solubility) very frequently is a concomitant of pregnancy, and should, therefore, be clearly understood and pointed out, that it may secure *early* attention, a necessary precaution in such cases. Cases so occurring, if neglected, are very liable to require the loss of the tooth to elude a worse calamity, viz., a malignant degeneration of the processes, that is liable to extend to the body of the maxilla, producing great deformity, and occasionally death!

What, then, are the more prominent conditions of the system in which this disease occurs? Ans. A *soluble* state of the system (as already stated) the *great* example of which is pregnancy, and hence the frequency so markedly present in such condition.

The next example of a state of *solubility* of the tissues is deranged chylopoetic system, whose predominating *variety* is what is termed malarial or aguish tendencies. I have not known a single case of alveolar abscess occur outside of the above range of molecular conditions.

Atrophied pulps are a prolific source of abscess in good constitutions. In fact it takes (or requires) a good molecular condition to admit of this form of death of pulps. Where this occurs, and some debilitating set of circumstances establish one of the above states of the system, abscess is of common occurrence.

Many cases of spontaneous cure coming under my observation, solely because the fear on the part of the patient, and a scrupulous delicacy and timidity on my part, in my very early and more ignorant days, deferred extraction (my then only known remedy for such cases) until returning health established bearable conditions, and *saved* the organ for future use, taught me that each pregnancy might cause an eruption of the volcanic trouble to subside again, and be useful till like circumstances, oft repeated, either destroyed the explosive tendency, or the integrity of the tooth itself, the latter occurring most frequently. Physicians have seen more of these cases than dentists by far.

The mode of spontaneous cure is very suggestive as to surgical treatment. Benignant pus and other contents of the sac frequently absorb without involving, to much extent, the cellular tissue. But when contents are malignant, the more promptly and completely they are evacuated the more rapid will be the return to health.

Where cul-de-sacs retain malign contents, extension of a sinuous burrowing character may be expected to complicate the case. Pulp chambers often supply this destructive agent a hiding-place, from which to commence the disintegrative action.

Time required for maturing abscess varies. Progress, arrest, dispersion depend upon constitutional tendencies.

Abscess may occur on a single fang of a multifanged tooth, or on all the fangs at once, and the nerve or nerves (pulp) may or may not be dead. Secondary dentine, in nodular masses, is very often met with in such cases, in the bodies and heavier portions of the pulp, as results of the presence of inflammation attending the abscess, thus proving their vitality.

Is the cessation of the susceptibility to thermal changes attributable to the non-conducting power of the secondary dentine? or does some change take place in the pulp itself, resulting in the tolerance so universal in cases of recovered abscess, and where large metallic fillings have been the source of shock? We must be very careful that we do not interpret absence of pain or shock always to mean tolerance; for many pulps die and absorb, or convert into benign pus, that occupies the chamber for years, sometimes, without giving tangible testimony to a superficial examination of the positive death of the pulp. Such cases are ready to create a disturbance whenever, for any cause, debility or intolerance becomes present, and then, usually, is the time thought to be the incipiency of abscess.

I have now under treatment two molars, right first superior and inferior, that were carefully and well filled by one of our most reputable dentists of that State of princely dentists, New York, that have passed exactly this train of conditions: one, the lower, had formed and ruptured its abscess; the other had only matured the sac around the buccal fangs, and slightly enlarged the region without causing more than a little uneasiness, not amounting to pain.

I have filled both into the fangs after preparatory treatment, and the abscesses are now doing well, discharging effete tissues at fistulous openings established for this purpose, which are dressed now alternate days.

As to treatment, I can now, for want of space, give only a very abridged synopsis of what it ought to be.

Treatment of alveolar abscess naturally divides into abortive, and coincident or accelerating.

Abortive can only be successful in cases where solubility is slightly present, and very local or circumscribed. Two methods of abortive treatment are admissible: 1. Local and constitutional stimulants or sedatives. 2. Surgically freeing the local congestion, confining serous and neural circulation.

Coincident (coinciding) or accelerating treatment may also be local or general constitutional, and consists in assisting nature to fulfill her intents, by hastening and abridging her processes.

CLEVELAND, July 22, 1861.

EDITORIAL.

OXY-CHLORIDE OF ZINC.

THIS substance, as a filling for teeth, has attracted the attention of many members of the profession for some time, and, like all new things, has had its advocates and its opponents. To whom the credit belongs of first introducing it to the dental profession we do not know, as we give new things little attention while undergoing their mutations from the experimental to the practical. The mere *venders* of it lauded it so extravagantly that it was repulsive, and those who had used it, in many cases failed, and of course we gave it no attention, and looked upon it as among the fleeting catch-penny materials of the times, until our attention was drawn to it in an honest and candid, but not extravagant manner, by a gentleman of whom we were not before acquainted, about eighteen months since, Dr. J. T. Metcalf, of New Haven, and to whom we are under many obligations. Those who advocated it, claimed too much; and those who condemned it, did so in toto. Strange that in new things one party only directs attention to all that is good, and the other to all which is bad: the right ground can never be occupied in this way. The only candid, able, and fair article which we have yet observed upon the subject, where the merits and demerits are properly exposed, will be found in the present number of this journal, from the pen of Dr. J. T. Metcalf: the manner in which the subject is handled commends itself to every candid mind. The doctor sent us samples of his preparation twice; and, using it as directed, have met with unexpected success; and while we believe with him that where a tooth is strong and firm, gold is still the best, the zinc filling is invaluable in many cases, and, as he remarks, in dead teeth. We observe in the July number of the *Dental News Letter*, that the zinc filling has been used by "A Friend to Progress" some five years since; it was also referred to in the *Dental Register of the West*, June number, 1860; but Dr. Metcalf's experiments date prior to this time. We used the article as prepared by another manufacturer about two years since, but did not meet with the same success as with that furnished us by Dr. Metcalf. We saw a case a few days since; it was a large left superior molar; a dead tooth; it had been plugged with amalgam. Whether the amalgam shrunk from the walls of the cavity or the moisture forcing its way between the plug and the margin of the cavity so as to favor decay, we do not know; but the plug seemed to be too small for the cavity, and the tooth was in a state of decay. We removed the amalgam and filled the tooth with the paste sent us by Dr. Metcalf; the buccal wall of the cavity was so thin and transparent that the plug could be distinctly seen through it. We took this as a good case to observe whether the zinc would decompose the tooth substance or not: up to this time, sixteen months, it is as good as when first introduced. We condemned the zinc filling at first because we saw many cases where it had been used, and unsuccessfully too, in small cavities in front teeth, where there was no excuse for using it; we doubt not that its restricted use will be of great value to the profession. We will give our experience with it as circumstances may dictate, and hope other members of the profession may do the same. J. D. W.

PROFESSIONAL JEALOUSY.

In connection with Dr. Allen's paper on this subject, which is presented in another part of the magazine, we would direct attention to a fact, which no doubt has been noticed by every careful observer, that what the world calls *conversation* is—with some fractional differences, too small to be noticeable—mainly *biographical* or *autobiographical* in its character; in other words, friends and acquaintances, as a general thing, entertain each other with what they have done, are going to do, and can do; or what others have not done, should not do, or cannot do. There is this difference, however, between refined and elevated natures and low and groveling spirits—the first finds pleasure in contemplating the excellencies, and only regrets at the shortcomings of human nature; while the latter apparently gloats over the imperfections of others.

When that eminent orator, dramatist, and wit, Richard Brinsley Sheridan, makes Sir Peter Teazle, in "The School for Scandal," say, in response to the hostess, on leaving a party where the characters of all their absent friends and enemies had been severely commented upon, "Your ladyship must excuse me; I'm called away on particular business; but I leave my character behind me," he gave unmistakable evidence of his knowledge of the common practice of small minds, whose pitiful natures can find no higher occupation than that of traducing those with whom they are brought in contact by the relations of business or pleasure. Looking entirely upon the dark side, magnifying each defect, and suppressing everything that could be said to the advantage of others, such persons appear to be actuated by the desire to drag others down to their own level, find extenuation and countenance for their own faults, or, in the language of Butler,—

> "Compound for sins they are inclined to,
> By damning those they have no mind to."

The comments of such persons have a wide range, from the character of the individual to everything emanating from or connected with him; and it would be singular if a defect thus common with a portion of the world should not invade, to a certain extent, the profession of dentistry. That such is the case, the communication referred to, and the experience of every practitioner, no doubt will more or less corroborate.

A lengthened and intimate acquaintance with a large number of the profession, who, as a general thing, in commenting upon their fellow-practitioners, have expressed themselves in terms of admiration and respect, or, where they could not say anything to the advantage of another, have refrained from giving utterance to their sentiments, induces us to believe that the disposition to malign their fellows is the exception, rather than the rule, with those who feel a deep interest in the advancement of the dental profession.

Although it will be readily conceded that those who can indulge in such practices are unworthy of notice, yet it is an indisputable fact that very worthy men have frequently allowed themselves to be unnecessarily annoyed by the ungenerous comments, or *reported* comments, of others. And here we would take occasion to say that the majority of the remarks which are carried backward and forward between practitioners by their patients should be received with many grains of allowance; and when one feels that he has been aggrieved by the strictures of another whom he has been accustomed to respect, in place of nursing his trouble in secret, let an explanation be demanded; and in nine cases out of ten, the word unkind, or wrongly taken, which has often severed the most intimate professional relations, will be found very different from what it was when magnified in importance by the tale-bearer.

Admitting, however, that one really has been maligned by the innuendoes, the covert or open attacks of a practitioner, or that a number of them waste their time in the same elevated occupation; what then? Work on, the same as if they were not in existence, and, making no response, allow a life to speak for itself. What folly it would be to elevate such persons in importance by noticing them, engage in a fruitless encounter, exhaustive alike of time, energies, and temper, or allow a feeling of despondence to overcome one to such an extent as to dampen all ardor for improvement and advancement!

So far as the active purposes of life are concerned, there perhaps can be no more deplorable state of mind than that last referred to. Every one, according to temperament, is more or less liable, when things appear to be going wrong, or the system is a little out of order, to moments of despondence. In healthy physical and mental organisms such feelings, however, are only ephemeral in their existence; but some persons are so unfortunately constituted that they succumb without a struggle to difficulties and oppositions which only tend to develop the latent powers and energies of others. They lack that indomitable energy which enables such natures, when difficulties are to be overcome, to labor on while the world rests, and who, undiscouraged by reverses, make more careful preparation for the future.

There can be no question that talents are not always recognized as promptly or as fully as they should be; but no one has a right to say on that account that the world opposes and does not show him a fair chance.

According to individual estimates, there are many thousands—ay, millions—of neglected geniuses; but as they afford the world no tangible proof of the fact, their ipse dixit not being regarded as all-sufficient evidence, the claim is denied, or passed over in silence and neglect.

If the physical or intellectual capacities of men are not equal to the struggle demanded by their aspirations, if their love of ease and pleasure is so great that they allow opportunity after opportunity to pass by unimproved, or if they waste that time in useless repinings and vain regrets which should be devoted to self-culture, physical, moral, and mental, they have no right to blame the world, for the defect is with themselves, and the sooner they adopt the advice of the Delphian oracle, "Know thyself," the better it will be for themselves and others. Truly has it been said that he who conquers himself is greater than he who conquers many cities.

Far from the world opposing, it is ever willing and *eager* to *help those* who *help themselves;* for he who helps himself not only creates a feeling of self-reliance and sets a good example, but also helps the world by the act. He is not a mere consumer, but, in every sense of the word, a producer, and, like every laborer, is worthy of his reward. This he will gain, sooner or later, when his abilities, application, and integrity are justly recognized and appreciated.

To a properly constituted mind there is a genuine and heartfelt pleasure in rendering aid and encouragement to those who are struggling upward against every obstacle; one thus engaged, however, is only making just acknowledgment and compensation for similar services received from others in former days.

It is often, thus, in the power of one dental practitioner to render a tribute of respect to another, or for an old member of the profession to assist a young one, and when the opportunity is afforded, or when one is questioned by a patient with respect to the attainments and capabilities of another, worthy of respect, no petty jealousy or smallness of mind should induce one to damn with faint praise, but in a frank and manly manner give a thorough indorsement of his capacities. Such a course will not detract an inch from one's stature, and he who adopts it will find that he can afford to continue it.

There are cases, however, presented to the notice of the practitioner, in which he is called upon to pronounce judgment upon the failures of others. Let this be done with all justice to the patient and charity to the operator. The truth must be told, for that hurts no one; but in commenting upon failures, it is far better to deal leniently with them. One does not know all the circumstances and influences beyond the control of the operator that may have brought about such results. Again, if he expects any charity to be shown to his own shortcomings, he must extend it to others.

An experience of years, and large opportunities for observation, have taught us that, as a general thing, those who are loudest in denunciation of the failures of others have the greatest need for charity on the part of their compeers, so far as their own operations are concerned.

J. H. M'Q.

THE AMERICAN DENTAL CONVENTION.

It affords us much pleasure to announce that, notwithstanding the national troubles, our enterprising friends of this body will hold their annual convention in New Haven, Conn., on Tuesday, the sixth day of August next, at 10 A.M. We sincerely hope there will be a large attendance and a profitable meeting, and if in our power we intend to be present. J. D. W.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

New York Dental Journal—April.

"Professional Jealousy. (Paper read by Dr. John Allen before the New York Dental Association.)—In order to elevate our profession it is important that each of its members should contribute his due proportion of aid for the accomplishment of that object. This he can do by first qualifying himself for the discharge of his own professional duties, and by co-operating with, and sustaining other members of the profession who are entitled to confidence, not only in all the general movements that are made to raise the standard, but also to sustain his fellow-practitioners in their private practice so far as he can consistently, in an open, frank, and candid manner. Yet some make it a point invariably to disapprove by insinuations, or condemn outright, every operation they may chance to meet with that has been performed by another; whatever merit may attach to a piece of work, if not done by themselves, is entitled to no credit; they will find some fault, some hook to catch upon, by means of which they will endeavor to sink other operators as low as possible in the estimation of their patrons. If an individual has had services rendered by different dentists, he will find that each one (who is afflicted with this mental malady) will condemn in turn all that has been done by his predecessors; the last one consulted will endeavor to impress it upon the mind of his patient that all his former operations have been worthless, and that those who performed them were mere quacks who knew nothing of their business. But, says the patient, they were highly recommended to me, and some of their work has rendered me essential service; here is a tooth I had filled twelve years ago, and there is one that has been filled seven years, and they seem perfectly good yet. Very true, replies the doctor, they *seem* to be good, but you are not aware of the decay that is going on under those fillings; they are not filled as *I* would have filled them; if they had been they would have lasted you forty years. Well, replies the applicant, I do not wish anything done this morning, perhaps I will call again. Thus it will be seen that the doctor's efforts to malign his competitors served only to lower himself in the estimation of his supposed patron, for *he* takes his leave fully impressed with the belief that this wiseacre has missed his mark, for he savors as strongly of quackery, if not more so, than those he attempted to revile. * * *

"With these dead weights upon our profession, dental progress is retarded, and ever will be while a part of its members are trying to build themselves up by putting others down.

"Why should this be?

"Does any one really think that by so doing he will increase his own business or reputation? If so, he is mistaken, for professional jealousy neither benefits *him* who possesses it nor the profession to which he belongs; on the contrary, its withering influence contracts the mind, and often blights the fondest hopes of professional fame.

"It is an old saying, that in union there is strength, and it is no less true than ancient. Let us, therefore, be united in all that pertains to professional excellence, mutually receiving and imparting that which is useful, and gathering gems of thought from each other to place in our own diadems; approving and commending all that is right, and condemning only that which is founded in error."

NEW YORK DENTAL JOURNAL—JULY.

"LANCING GUMS. By ABR. ROBERTSON, D.D.S., M.D., Wheeling, Va.—As I intimated in the last number of the journal, I propose to offer a few observations on lancing the gums preparatory to extracting teeth.

"This, in some cases, is an important preliminary operation; and when required, should be done well and thoroughly.

"The cases which require the operation are the roots of such teeth as are decayed, or broken off so far below the gum and the edge of the alveolus that they cannot be seized or apprehended by the forceps, or other instrument to be used for their removal, without cutting, or otherwise injuring the gums; or such roots of teeth as from inflammation or otherwise have the surrounding gums more or less closed over them, rendering it difficult to apply any instrument, without first removing the gum, or at least not without inflicting a great deal more pain with the extracting instrument than with the knife.

"The manner and the amount of cutting will, of course, depend on the circumstances of the case. If it be a firm root, broken off so low that, to remove it, it is necessary to remove a portion of the alveolus, the gum should be dissected, by one or two strokes of the knife, from the alveolus, as deep as the forceps are to be applied and as wide as is necessary to facilitate their application; another cut should also be made, by a single stroke of the knife, in the direction of the length of the root, forming two small flaps of the dissected gum. The same operation should be performed on both the outer and the inner sides of the root, if the forceps are to be used; but if the case is one where the elevator is best adapted, it will only be necessary to make the cuts on the outside.

"In performing the operation, any of the curious, and even complicated lancets, on which so much exuberant ingenuity and skill have been expended, can, perhaps, with great care, be made to answer the purpose as well, or nearly as well, as a simpler and more convenient one; and a plain bistoury, or a scalpel, or a common penknife will answer just as well. Although, as I have said, this operation is sometimes necessary, and in some cases quite important, yet, as a general rule, it ought to be entirely omitted; and for various reasons. The first of which is, that, in all ordinary cases—and the exceptions are *very* rare—that is to say, in all cases of entire teeth, and most roots of teeth, it is entirely useless.

"The resistance to be overcome in the extraction of most teeth being offered mostly by the strength of the firm, dense membrane which unites their roots to their alveoli, it is, therefore, very evident that simply severing the gum from the neck of the tooth, to which usually it is but slightly attached, and all of it that can be reached by any ordinary gum lancet of but small extent, can have but little influence in lessening the amount of force required to extract them. A knife or gum lancet of any kind cannot, by any possibility, be carried far enough between a tooth and its alveolar process to sever but a very small portion of the periosteum, and it is very seldom that any one ever attempts to cut this membrane below the edge of the alveolus, unless it may be in the case of some loosened root, which he intends to remove entirely with his knife.

"The next great source of resistance, in this operation, and sometimes not unfrequently the source of greatest resistance, is the divergence or the convergence of their roots, or the divergence of them for a portion of their length, and their convergence the balance; requiring, if one or more of the roots do not first break, the removal of the bony septum between their roots, or the yielding of the parietes of the alveolar cells, or the springing of one or more of the roots to admit of their removal, even if the periosteum were all scraped or macerated away.

"Corrugations of the roots, or crooks in them, exert a similar influence, which no knife or lancet, of however ingenious form, can overcome.

"As already remarked, the attachment of the gum to the neck of a tooth is always but slight, and the extent inconsiderable; so slight and so inconsiderable, that no operator or patient could possibly appreciate the difference in the amount of force required, or the pain experienced in the operation, whether the gums were cut or not.

"And besides all this, the lancet is rendered entirely unnecessary in almost all cases, by the fact that properly constructed forceps—forceps thoroughly fitted to each class of teeth to which they are to be applied—will quite as thoroughly remove the gum from the neck of the tooth, and by the same movement that applies them, as any lancet can be made to do it, and with no more pain in the application—with even less pain in the application—than if the gums had been ever so freely lanced.

"The operation of lancing the gums preliminary to extracting a tooth is, in most cases, not only unnecessary, but decidedly objectionable, for many reasons. It produces a great deal of unnecessary pain.

"With many patients the dread of having the gums lanced is greater than that of having the tooth extracted. Many timid and nervous patients can, by great effort, bring themselves to bear the infliction of one pain, but cannot a second. So, it is no uncommon thing for such a one to submit to having the gums lanced, and then to go away without having the tooth extracted, but who would gladly have had it out if it could have been done at once, *as it should have been.*

"There is also some more danger from excessive hæmorrhage when the gums are lanced, than when they are not. A smoothly cut surface is more liable to bleed badly than a lacerated wound. Therefore, especially in all cases when it is necessary to extract a tooth, and a *hæmorrhagic diathesis* is known to exist, or is mistrusted, the use of the lancet should be most sedulously avoided.

"I once knew a child to bleed to death in the hands of a very able surgeon, from simply cutting the child's gums to facilitate the eruption of its upper deciduous central incisors, though all known means were resorted to to arrest the bleeding, from simple and long-continued pressure through all the range of styptics and astringents—from cold water to the actual cautery.

"The only arguments known to me in favor of the general use of the lancet is, that by the adhesion of the gums to the neck of the tooth sometimes the gum may be lacerated before that adhesion yields. If this were the usual result of neglecting to use the lancet, or if it were even a frequent occurrence in consequence of such neglect, there would be force in the argument. But as that accident, in my experience and observation, does not occur more than once in several thousands of operations, and even then is usually the result of other carelessness, the good rule not being observed of operating no faster than the eye can follow, or than the hand can be stayed at any stage of the operation; and as the forceps, as already demonstrated, generally accomplishes the object more effectually, without loss of time to the operator, with less pain and without the interval of terrible suspense to the patient; therefore, on the principle of 'the greatest good to the greatest number,' I cannot think it justifiable to torture the great multitude in order to save an individual, or even a few persons from the possibly slight infliction of pain that might thereby have been avoided.

"Have a gum lancet, then; let it be a good, plain, practicable, instrument, but use it seldom."

A large number of the dental profession, among whom are many for whose opinions we have every respect, regard it as an all-important and essential point to lance the gums prior to extraction. Convictions based upon an experience extending over a considerable period compel us, however, to add our testimony in support of the position assumed by Dr. Robertson; and in doing so, take occasion to say, if there is one writer in particular for whose matter and style of communication we have a decided preference, it is his. Not that we can always agree with his views, but there is a straightforward, decided, and terse way of expressing himself, a manner which seems to indicate that the writer would as soon think of apologizing for the head upon his shoulders, as for having opinions of his own, that it is not only refreshing but encouraging to recognize in him an earnest and efficient laborer in the cause of dental science.

There are numerous cases in which it is highly proper and necessary to employ the gum lancet, prior to applying the forceps in extracting teeth; but to assert, as some do, that it should be used under all circumstances, is, in our opinion, claiming more than is absolutely demanded.

The attachment between the gum and the neck of the tooth, it is true, is sometimes so firm that it is not at all surprising Caldwell should have imagined he had made a great discovery in his so-called dental ligament. In a few cases this attachment has been so firm that *bungling* operators have removed two teeth in the attempt to extract one.

According to our experience it is, by far, the exception and not the rule when such decided attachments exist; when they do, the lancet, of course, should be employed; but, as a general thing, the anatomical relations between the gum and the tooth are such that they can be readily and thoroughly severed by sharp-edged, thin-bladed, properly-constructed forceps, driven rapidly and decidedly as far up the root as practicable. As Dr. R. truly remarks, the strong periosteal attachment between the alveolus and the roots, their divergence and convergence, their exostosed or curved condition are, one and all, by far greater difficulties to overcome, in the extraction of teeth, than the connection with the gum.

With very many patients lancing the gums is the most painful part of the operation, and they frequently refuse to permit anything more to be done; the sight of the blood, in some instances, is sufficient to induce syncope, and its presence in the mouth invariably complicates the operation, making frequent rinsing of the mouth with water absolutely necessary before a fair view of the tooth can be obtained, or the forceps properly applied.

We have said there are instances in which, in our opinion, the lancet should be used. They are as follows: When the very decided attachment, already referred to, exists; when roots are buried in the gum; and invariably prior to extracting wisdom teeth, as there is very great danger, if the attachment between the gum and the posterior part of this tooth is not severed, that the soft palate or the pharynx may be severely lacerated, by the parts being torn away with the tooth.

There is not want of humanity in dispensing with the lancet, as a general thing, but, on the contrary, a proper regard for the comfort and feelings of the patient.

The Dental Review, London—May.

"Hippopotamus Teeth or Tusks. By Thomas D. Rock.—One great difficulty—happily not always insurmountable—which invariably attends the path of the technological student, is that which arises from the erroneous application of proper names. Thus, the article now proposed for consideration is treated by different authors under the terms sea-horse teeth, morse teeth, and hippopotamus teeth—the first two names being applied, indiscriminately, both to the walrus and hippopotamus: although I believe that, *commercially*, the term sea-horse is restricted solely to the teeth of the latter animal.

"The word hippopotamus is compounded of two Greek nouns, ἵππος and ποταμὸς, and literally signifies 'the river-horse,' a name bestowed upon this singular animal by the ancients, to whom it was very probably suggested by the amphibious nature of the creature, and the striking resemblance which its profile bears to that of the equine family; more especially when seen just emerging from the surface of the water, with ears erect, the unwieldy body, at the same moment, being hidden from view.

"Visitors to the Regent's Park Gardens, where two hippopotami are to be seen constantly enjoying the pleasures of the bath, may, by careful observation, verify for themselves the appropriateness of the name thus bestowed upon this interesting mammalian.

"The Dutch Boers of South Africa distinguished this animal by the rather curious appellative of 'zee-coe,' or sea-cow.

"Hippopotami form by themselves a distinct genus of the pachydermatous, or thick-skinned animals; and even of this distinct genus there is but one living species—'*Hippopotamus amphibius*'—found exclusively in certain parts of the African continent.*

"The interest attaching to this animal from an economic point of view is rather limited, being confined to a local use of its skin and flesh by the African natives and colonists, and the more general application of its powerful teeth, or tusks, as a substitute for true ivory.

"However interesting it might be to consider the general anatomical and physiological features of this gigantic creature, or to trace out the resemblance thought to exist between it and the 'Behemoth,' described in the Book of Job, I propose to confine my remarks exclusively to its singular dental apparatus, and such other matters as relate immediately thereto.

"The mouth of the hippopotamus is one of the most capacious in the animal world, and is armed with a set of teeth of the most powerful description, adapted solely for cutting and bruising its food, which is of the coarsest and rankest kind, and such as is found lining the banks of the tropical rivers of Central and South Africa.

"The dental formula is as follows:—

$$\text{Incisors}\ .\ .\ \left\{\begin{array}{l}\text{upper jaw}\ .\ \ 4\\ \hline \text{lower jaw}\ .\ \ 4\end{array}\right. \qquad \text{Canines}\ .\ .\ \left\{\frac{1\text{—}1}{1\text{—}1}\right.$$

$$\text{Molars}\ .\ .\ \left\{\frac{7\text{—}7}{6\text{—}6}\right. = \text{38 teeth in all.}$$

"The molars evidently play but a secondary part in the economy of this animal, and a portion of them are described as 'strictly false molars;' that is, the three molars of both jaws that succeed the canines, and which are conical in form, having only one point. The posterior molars are armed with two rows of points, which gradually wear down to a trefoil surface. To man, the molars of the hippopotamus are perfectly useless.

"Incisor teeth, as the name imports, are the cutting instruments of the jaw; and of these teeth, which are situated in the fore front of the mouth, the hippopotamus possesses eight: four in the upper jaw, which are short, conical, cylindrical, and curved slightly inward; and four in the lower jaw, cylindrical, straight, pointed and projecting forward, the two centre ones especially, termed lateral incisors, which are both longer and larger than those next the canines. These incisor teeth are of some value in the arts for their ivory.

"It so happens, that the teeth most highly prized by man are those that occupy the most prominent place in the dental economy of the hippopotamus: these are the canines, which may be described as 'enormous tusks,' sharpened at their points, by mutual attrition of those in the upper and lower jaw, into oblique 'chisel-like edges.' They are four in number, two in each jaw; the upper ones being short, slightly curved, rounded on the outer side, deeply furrowed in the centre on the inner side, and ridged longitudinally, more especially on that portion of the tusk which is coated with the enamel. The canines of the lower jaw are considerably larger, are very much curved, like the tusks of a boar, and in shape somewhat elliptical; they are also ridged after the same fashion as those in the upper jaw.

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* Some naturalists distinguish between the hippopotami of South and West Africa, making two species—*H. Capensis* and *H. Senegalensis*—but the difference is so small that this division is for the most part rejected.

"Both the incisors and canines of this animal, although properly called teeth, are virtually tusks; for they are uninterrupted in their growth, are formed on cores, and consequently hollow for a considerable portion of their length.

"The canine teeth or tusks of the hippopotamus are primarily composed of the two substances known as *dentine* and *enamel:* the first named forming the principal body of the tusk, while the enamel is merely an external shield, or tooth armor, of a denser and more durable material, and described as sufficiently hard to strike fire when contused with steel.

"The enamel is not continuous throughout the entire circumference of these tusks, but only to the extent of from one-half to two-thirds of the whole, and occurs on such portions as appear to be the most exposed to injury: lengthwise, the enamel extends from end to end, and is formed anew, in conjunction with the dentine, as the tusk grows. In thickness, the enamel varies from 1-32d to 1·16th part of an inch, according to the size of the tusk. River-horse or hippopotamus teeth contain less organic matter (33·00) than either elephant ivory or the tusk of the walrus, in which substances the organic elements amount to about 44·00 and 38·00 per cent. respectively. The chemical composition of these teeth, as well as the essential difference between their dentine and enamel, is advantageously illustrated in the following analyses by Thomson:—

HIPPOPOTAMUS TEETH.

Constituents.	Enamel.	Dentine.
Organic Matter	4·102	33·41
Phosphate of Lime	83·630	55·90
Fluoride of Calcium	0·850	....
Phosphate of Magnesia	....	1·19
Carbonate of Lime	10·620	9·14
Chloride of Sodium Chloride of Potassium	0·800	0·36
Total	100·002	100·00

Sp gr. of the dentine, 1·866.

"A mere glance at the foregoing table is sufficient to discover the more prominent qualities of the teeth now under consideration. The larger proportion of mineral matter in this dentine, coupled with great density of formation, renders it both harder and less liable to receive stains than other bone substances; while to the smaller amount of organic matter, and the almost entire absence of oily particles, the delicate and superior whiteness of these tusks is to be attributed. It is the combination of these especial qualities, density and whiteness, that makes the hippopotamus teeth so invaluable to the dentist.

"On the other hand, the absence of oily matter, and the comparatively smaller amount of animal substance in this bone, induce brittleness, and cause it to be more easily affected by the acids of the food and saliva.

"The enamel is still harder and whiter than the dentine, by reason of its being composed almost exclusively of phosphate of lime, with only about 4 per cent. of organic matter. Dentists are the principal consumers of the canines of the hippopotamus; for no bony substance has hitherto been found that possesses, to so great an extent, the properties requisite to the successful performance of their art. Mineral teeth are, for the moment, in great favor; but, after all, it is very questionable if any artificial substance can be made so appropriate as the precise material which an infinitely Wise Being has selected, and supplied, both to man and the lower animals, for the purpose of mastication.

"When these tusks are employed for the manufacture of front teeth, the enamel on the surface is valued, and retained, for the sake of its delicate whiteness and density, as before described; and the tusk is so manipulated that this enamel forms the outer or visible surface of the teeth. But when used in the production of artificial gum, or back teeth, (molars,) the enamel is removed by the aid of a chisel and grindstone, or, more frequently, by steeping the tusks or sections thereof in a solution of muriatic acid, sufficiently long to destroy the enamel, without affecting the dentine; the softer parts, at the same time, being coated or painted over with some fatty substance, to preserve them from injury during the operation. Sometimes the blowpipe is resorted to as a means of removing the enamel, and a fine file is afterward used in either case, for imparting the final surface to the bone. The points of the canines are generally defective, and in the process of working are first removed, the tusks being afterward sawn into transverse sections, of varying thickness, according to the destined application, and as required by the operator.

"Although the teeth of the hippopotamus are all but monopolized by dentists, yet the very excellent quality of their dentine is more widely appreciated, and likewise adopted for a few other purposes in the arts. When great delicacy is required, this bone is found more suitable for carvings than the ivory of the elephant, and is much used in France for this purpose, especially in the manufacture of fine brooches.

"The handles of surgical instruments are sometimes formed of this material, for which purpose it is admirably adapted, because of its being less liable to receive stains than other sorts of ivory.

"Vases made of hippopotamus tusks were displayed in the Great Exhibition of 1851; and in the Irish Exhibition, a Mr. R. Barter, of Dublin, exhibited some elegant intaglio brooches, consisting of figures carved in the same substance, and mounted on a groundwork or surface of cornelian. The enduring nature of the hippopotamus ivory appears to have been known and valued as early as the first century; for, according to a writer named Pausanias, a certain Greek statue of 'Dindymene' had its face 'formed of these teeth, instead of elephant ivory.'

"A few words on the incisor teeth of the hippopotamus received into commerce will suffice. They are not so generally imported as the canines, with the exception of the two lower, lateral, and projecting incisors, commonly called tusks in the market, as distinguished from the canines, which are usually termed teeth. These projecting incisor teeth, as already described, are long, straight, and hollow for a portion of their length, like the canines, but differing vastly in quality from the latter, being considerably softer, and more easily affected by the fluids of the mouth, so that they are seldom used by dentists. Yet these long, straight teeth have their especial application, being employed in the manufacture of the long knitting needles and netting meshes used by ladies, as well as for other more general purposes. The enamel on these lateral teeth appears to be confined to the projecting point, and does not extend into the jaw.

"The smaller and curved incisors of the upper jaw are comparatively valueless, except for common turnery work.

"I may here mention, that unless the teeth of the hippopotamus are employed by the dentist, the enamel is always removed, and generally by means of an acid bath, as no ordinary tool produces any effect upon it.

"As the Board of Trade returns furnish no separate account of the imports of hippopotamus teeth, I cannot give any statistical table of the extent of our trade in this article, but should roughly estimate the quantity imported at from 7 to 10 tons annually; which, considering the limited source of supply, is far from being small. The importation of these teeth into Liverpool in the year 1850 was 2½ tons; and as by far the larger quantity received enters the port of London, I think my estimate of the total is not overdrawn. The value of hippopotamus teeth depends both upon size and quality—those being the most esteemed that are large and free from flaws. In years that are past, as much as 30s. per lb. has been paid for fine tusks; but the price may now be said to range from 1s. per lb. to 17s. or 18s. per lb. At a recent sale, some very small teeth realized only 7½d. per lb.; but the following table, compiled from a sale at the end of last year, will perhaps convey to the reader a better idea of the comparative value of these tusks:—

Teeth	averaging each	6	lbs. realized	17s.	per lb.
"	"	5¼	"	13s.	"
"	"	5⅕	"	8s. 9d.	"
"	"	5	"	11s.	"
"	"	4½	"	11s. 6d.	"
"	"	4⅕	"	14s. 3d.	"
"	"	4	"	10s.	"
"	"	3¾	"	8s. 6d.	"
"	"	3¼	"	6s. 6d.	"
"	"	3	"	3s. 7d.	"
"	"	2¾	"	4s. 9d.	"
"	"	2	"	2s. 2d.	"
"	"	2	"	1s.	"
"	"	1½	"	1s. 1d.	"
"	"	1⅓	"	2s. 4d.	"

"Allowing 20 lbs. on an average for every set of hippopotamus teeth imported, and presuming our total imports are 10 tons, no less a number than eleven hundred of these giant creatures must be slaughtered every year to supply our markets.

"At the present time, the demand for hippopotamus teeth is small, and no scarcity is felt; but as civilization advances in West and South Africa, and the animals become gradually exterminated, it is probable that the time may come when this comparatively insignificant, though useful and valuable article of commerce, will be sought after in vain."

SELECTIONS.

[We are indebted to the courtesy of Harper & Brothers, New York, for permission to publish the following extracts from the highly interesting volume just issued from their press, entitled *"Adventures in Equatorial Africa,"* by P. B. Du Chaillu.]

Some have given to the gorilla the honor of approximating nearest to man in structure, while others reserve this for the chimpanzee. Dr. Jeffries Wyman, the accomplished and distinguished comparative anatomist of Harvard University, was the first to give a scientific account of the cranium and of a part of the skeleton of the gorilla in 1847. To him belongs the honor of having first brought to the knowledge of the scientific world this wonderful animal. In 1849, Dr. Wyman gave another description of two additional crania of the gorilla. In these memoirs he classified this animal in the genus *Troglodytes.*

In 1848, Professor Richard Owen, the learned curator of the British Museum, published an account of the gorilla in the Transactions of the Zoological Society of London, and in this he agreed with Dr. Jeffries Wyman, and retained the gorilla in the genus *Troglodytes.* Since 1848, that illustrious zootomist has written several memoirs, giving extended definitions of the anatomical structure of the gorilla.

Professor Duvernay and Professor Isidore Geoffroy St. Hilaire, of Paris, have written long memoirs on the comparative anatomy of this wonderful animal; and both, after very able scientific description, consider the differences in the osteology, dentition, and outward character of the gorilla to be of sufficient generic importance to create the genus gorilla. They give the trivial name of ngina to the animal.

Professors Duvernay, St. Hiliare, and Dr. Jeffries Wyman agree in putting the gorilla below the chimpanzee in its anthropoid character, while Professor Owen is of opinion that the gorilla is nearer akin to man than the T. niger or chimpanzee, and does not think that the anatomical peculiarities of the animal are sufficient to make a new genus. On this last point he agrees with Dr. Wyman.

The most important anthropoid characters of the gorilla, which are referred to by Professor Owen in his first memoir, are the following:—

"1st. The coalesced central margins of the nasals are projected forward, thus offering a feature of approximation to the human structure, which is very faintly indicated, if at all, in the T. niger, [or chimpanzee.]

"2d. The inferior or alveolar part of the premaxillaries, on the other hand, is shorter and less prominent in the T. gorilla than in the T. niger; and in that respect the larger species deviate less from man.

"3d. The next character, which is also a more anthropoid one, though explicable in relation to the greater weight of the skull to be poised on the atlas, is the greater prominence of the mastoid processes in the T. gorilla, which are only represented by a rough ridge in the T. niger.

"4th. The ridge which extends from the *ecto-pterygoid* along the inner border of the foramen ovale terminates in the T. gorilla by an angle or process answering to that called 'styliform' or spinous in man, but of which there is no trace in the T. niger.

"5th. The palate is narrower in proportion to the length in the T. gorilla, but the premaxillary portion is relatively longer in the T. niger."*

In 1849, Dr. Wyman, in referring to the above memoir of Prof. Owen, says, in refutation, and claiming for the chimpanzee a nearer affinity to man: "If, on the other hand, we enumerate those conditions in which the enge-ena [gorilla] recedes farther from the human type than the chimpanzee, they will be found by far more numerous, and by no means less important.

"The larger ridge over the eyes, and the crest on the top of the head and occiput, with the corresponding development of the temporal muscles, form the most striking features. The submaxillary bones articulating with the nasals, as in the other quadrumana and most brutes; the expanded portions of the nasals between the frontals, or an additional osseous element of this prove an independent bone; the vertically broader and more arched zygomata, contrasting with the more slender and horizontal ones of the chimpanzee; the more quadrate foramen lacerum of the orbit; the less perfect infra-orbital canal; the orbits less distinctly defined; the larger and more tumid cheek-bones; the more quadrangular nasal orifice, which is depressed on the floor; the greater length of the ossa palati; the more widely expanded tympanic cells, extending not only to the mastoid process, but to the squamous portion of the temporal bones—these would, of themselves, be sufficient to counterbalance all the anatomical characters of the (enge-ena) gorilla.

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* Op. cit., vol. iii., *Transactions of the Zoological Society,* 1848.

"When, however, we add to them the more quadrate outline of the upper jaws; the existence of much larger and more deeply grooved canines; molars with cusps on the outer side, longer and more sharply pointed; the dentes sapientiæ of equal size with the other molars; the prominent ridge between the outer posterior and the anterior inner cusps; the absence of a cristagalli; a cranial cavity almost wholly behind the orbits of the eyes; the less perfectly-marked depressions for the cerebral convolutions; and, above all, the small cranial capacity, in proportion to the size of the body, no reasonable grounds for doubt remain that the enge-ena occupies a lower position, and consequently recedes farther from man than the chimpanzee."

* * * * * * * * *

Professor Owen says: "In the greater relative size of the molars compared with the incisors, the gorilla makes an important closer step toward man than does the chimpanzee. * * * * * * * * * * *

"In the chimpanzee the four lower incisors occupy an extent equal to that of the first three molars, * * * * while in man the four are equal to the two first molars and half of the third. In this comparison, the term molar is applied to the bicuspid."[*]

"The proportion of the ascending ramus to the length of the lower jaw tests the relative affinity of the tailless apes to man.

"In a profile of the lower jaw, compare the line drawn vertically from the top of the coronoid process to the horizontal length along the alveoli: in man and the gorilla it is about seven-tenths, in the chimpanzee six-tenths.

"*Every legitimate deduction* from a comparison of cranial characters makes the tailless *quadrumana* recede from the human type in the following order: gorilla, chimpanzee, orang, gibbon."[†]

Professor Isidore Geoffroy St. Hilaire makes a new genus for the gorilla, which he has named Gorilla, and has called the only species of the genus thus named *ngina.* This arrangement he bases on the following structural peculiarities:—[‡]

"The study of the general conformation of the head of the gorilla, of the proportions of his limbs, and consequently of the general conditions of station and progression, such as conformation of the hands and the structure of the molars of the lower jaw, lead us to the conclusion, which is confirmed by many secondary facts, that he does not belong to the genus

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[*] Owen, p. 83.

[†] Ibid., p. 84.

[‡] See page 37, *Archives du Muséum d'Histoire Naturelle*, tom. x., liv. i. and ii.

Troglodytes. The animal constitutes in fact a distinct genus, to which the name Gorilla proposed by me, a few days after a specimen of the ape reached France, properly belongs.

"The following are the principal characters of this genus:—

"Head round in the young, but in the adult long, much compressed, and cranial crests very prominent. *Ears small,* in form resembling those of man.

"*Upper extremities long,* (but much less than in the orangs and gibbons,) reaching, when the animal stands upright, nearly to the middle of the leg.

"*Hands wide.* By this character it is distinguished as well from the orang as from the chimpanzee. The palm in particular nearly as wide as long, (a proportion almost exactly resembling that in man,) *fingers short* as compared with those of man and of the chimpanzee.

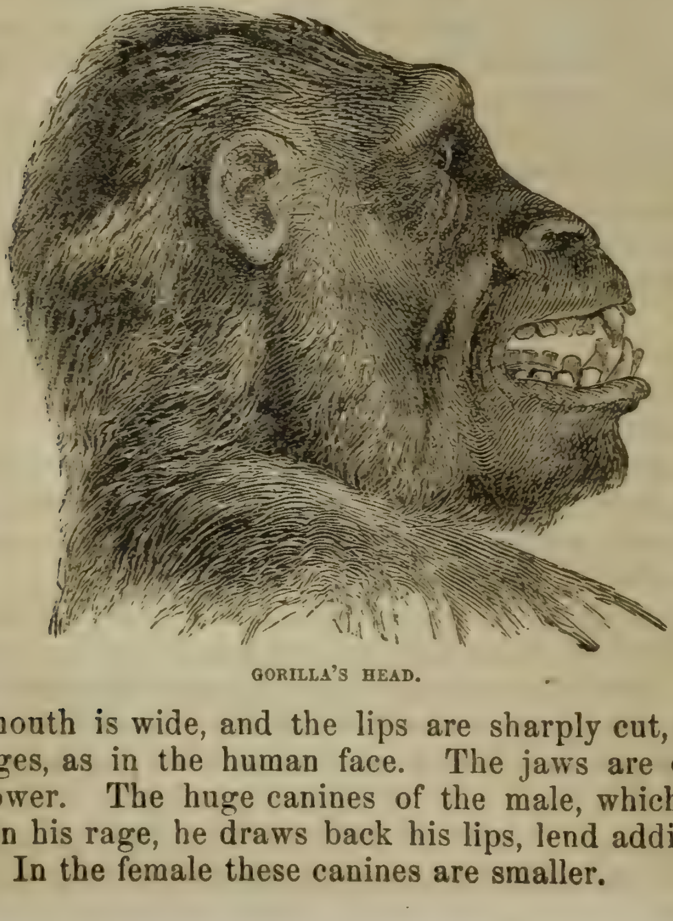
"Feet long, *the three intermediate toes* (in the male) *reunited by integument as far as the second phalanx,* nails of both fingers and toes much flattened, a form previously found only in man and the chimpanzee.

"*Canine teeth very large;* incisors nearly in straight line; the three *molars, on each side of lower jaw, prolonged and ridged in line of antero-posterior diameter.*

"Characters which especially distinguish the genus Gorilla from that of the Troglodytes are printed in italics."

For these and other reasons, Prof. St. Hilaire makes of the gorilla the *genus* Gorilla, and places it nearer the *Simians* in some respects than the *Troglodytes niger.* His arrangement or order is as follows: *Homo, Troglodytes, Gorilla, Simia, Hylobates.*

The eyes of the gorilla are deeply sunken, the immense overhanging bony frontal ridge giving to the face the expression of a constant savage scowl. The mouth is wide, and the lips are sharply cut, exhibiting no red on the edges, as in the human face. The jaws are of tremendous weight and power. The huge canines of the male, which are fully exhibited when, in his rage, he draws back his lips, lend additional ferocity to his aspect. In the female these canines are smaller.



GORILLA'S HEAD.

The almost total absence of neck, which gives the head the appearance of being set into the shoulders, is due to the backward position of the juncture of the head with the trunk. The brain-case is low and compressed, and the lofty ridge of the skull causes the cranial profile to describe an almost straight line from the occiput to the supra-orbital ridge. The immense development of the temporal muscles which arise from this ridge, and the corresponding size of the jaw, are evidences of the great strength of the animal.

The eyebrows are thin, but not well defined, and are almost lost in the hair of the scalp. The eyelashes are thin also. The eyes are wide apart; the ears are smaller than those of man, and in form closely resemble the human ear. They are almost on the same parallel with the eyes. In a front view of the face the nose is flat, but somewhat prominent, more so than in any other ape; this on account of a slightly projecting nose-bone. The gorilla is the only ape which shows such a projection, and in this respect it comes nearer to man than any other of the man-like apes.

I must own that, at first sight, judging from the living specimen and from its cranium, the gorilla presents all the features of a far more bestial animal than the *T. calvus*, *T. kooloo-kamba*, *T. niger*, or the *orang*. All the features of the gorilla, especially in the male, are exaggerated; the head is longer and narrower; the brain is backward; the cranial crests are of immense size; the jaws are very prominent, and show great power; the canines are very large. The proper cavity of the brain is marked by the immense occipital ridges. But the remainder of the skeleton of the gorilla comes much nearer to that of man than that of any other ape.

And, after a careful examination of the osteological facts which have been mentioned; after having observed the live gorilla and studied carefully its mode of progression, I came to the conviction that in its mode of progression the gorilla is the nearest akin to man of all the anthropoid apes.

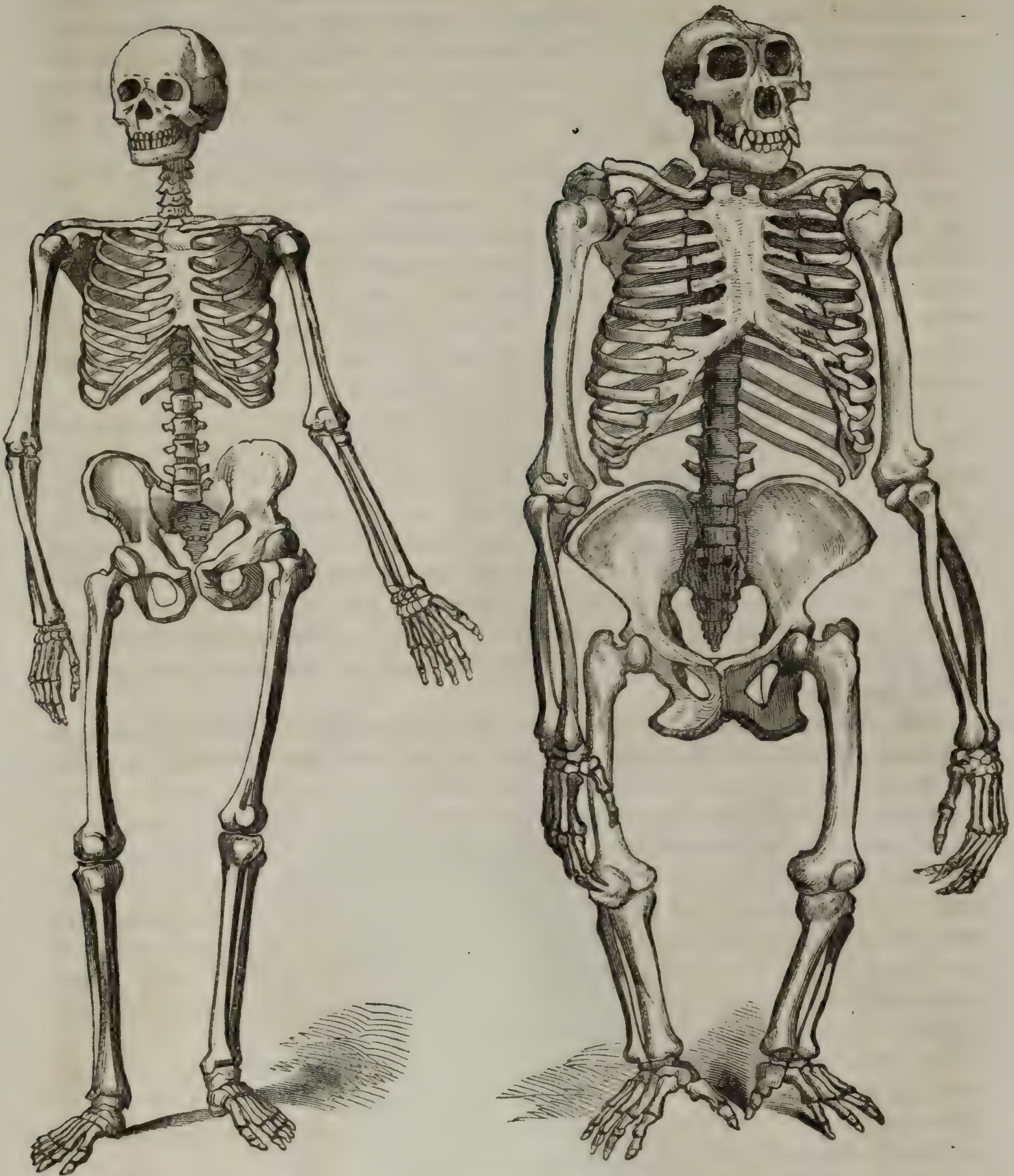
In size the gorilla varies as much as does man. Adult male gorillas measure from five feet two inches to six feet two inches. Part of a skeleton in the possession of Dr. Wyman shows that the animal might have reached the latter size when extended on the ground in a perfectly straight position; but as the gorilla is unable to stand erect, the legs being somewhat bent and the body thrown forward, the largest specimen would not *appear* higher than five feet nine inches.

To show the reader the contrast between the bony structure of man and the gorilla, I place diagrams of their skeletons side by side on the following page. The accompanying table of measurements shows the points of similarity and of difference:—

The T. calvus has sometimes fourteen pairs of ribs. Man has sometimes thirteen pairs of ribs; but what is termed ribs are vertebral elements, which are so called when long and free, and this is merely due to the coalescing of the last lumbar to the first sacral vertebræ.

The cervical series departs most from that of man. All the apes possess the same number of vertebræ as man.

The gorilla skeleton, *the skull excepted*, resembles the bony frame of man more than that of any other anthropoid ape. In the form and proportions of the pelvis, the number of ribs, the length of the arm, the width of the hand, and the structure and arches of the feet—all these characteristics, and also some of its habits, appear to me to place the gorilla nearer to man than any other anthropoid ape is placed.



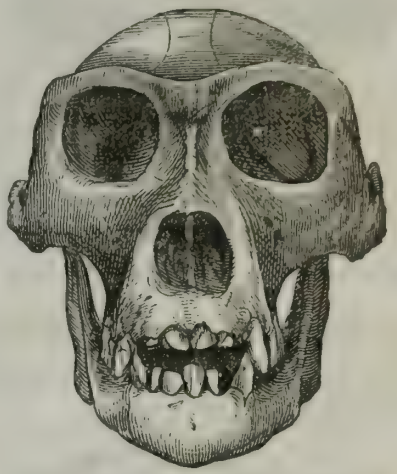
SKELETONS OF MAN AND THE GORILLA.

Man has	The Gorilla has
12 (and sometimes 13) pairs of ribs.	13 pairs of ribs.
7 cervical vertebræ.	7 cervical vertebræ, (the true vertebræ.)
12 dorsal do.	13 dorsal do.
5 lumbar do.	4 lumbar do.
5 sacral do.	5 sacral do.
8 carpal (wrist) bones.	8 carpal (wrist) bones.

Among all the anthropoid apes, the number of teeth corresponds with that in the human species, but the canines are much larger, especially in the male gorilla. The incisors also are large. In the ape the bicuspids are implanted by three distinct fangs, two external and one internal, and the external one is divided. In man they are implanted by one external and one internal; and in the Caucasian race the two fangs are sometimes united.

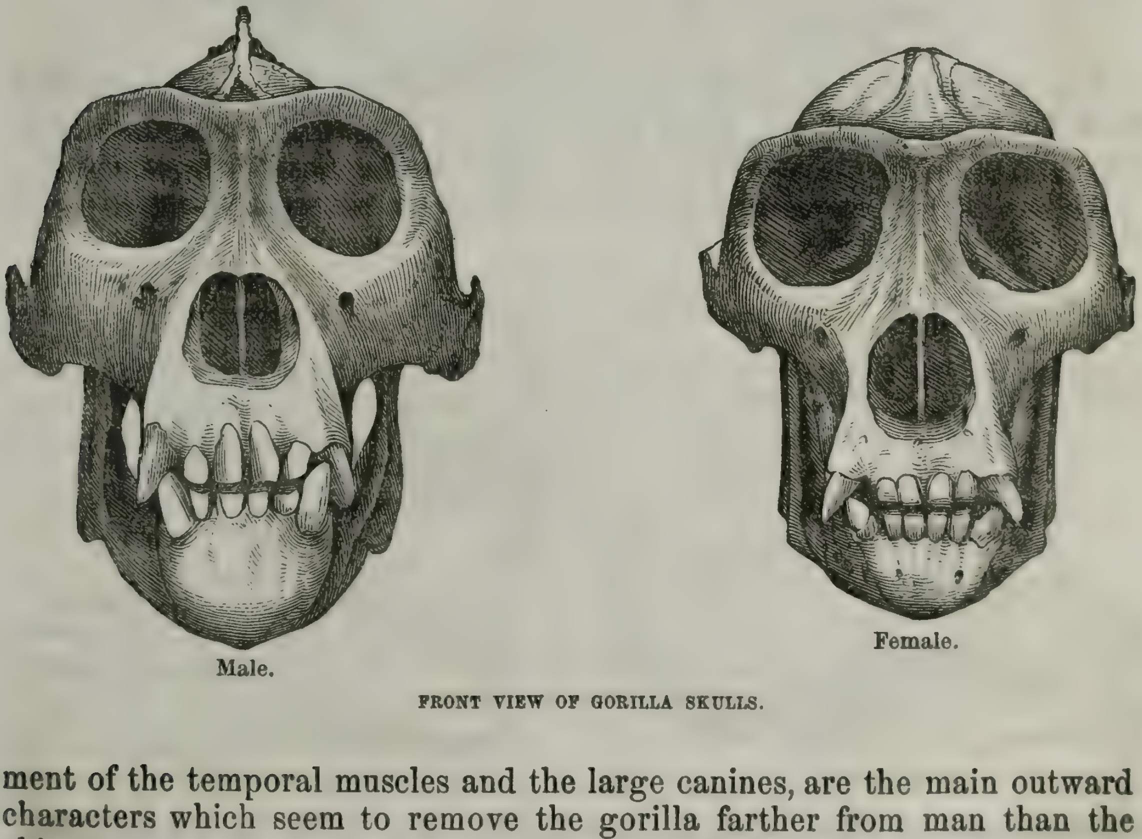
The skull here represented is that of a gorilla shedding his milk teeth. The upper incisors have fallen, and the four permanent ones of that jaw have made their appearance, while in the lower jaw the two lateral milk or first incisors are yet firmly in place, and the two central incisors of the second growth have made their appearance and are half grown.

The milk or first canines are yet firmly in place, and, on extracting one of them, the nucleus of the second or permanent tooth is scarcely discoverable. On withdrawing one of the bicuspids and one of the first molars of the lower jaw, the rudiments of the permanent ones are perceptible. In the upper jaw, the first set of bicuspids and molars have already been displaced by the permanent set, and the four wisdom teeth of this jaw have already made their appearance, and are in a more advanced condition than in the lower jaw.



FRONT VIEW OF A YOUNG GORILLA'S SKULL.

The large ridge over the eyes and the crest on the top of the head, and extending over upon the occiput, together with the corresponding development of the temporal muscles and the large canines, are the main outward characters which seem to remove the gorilla farther from man than the chimpanzee, and give to this animal so ferocious a look.

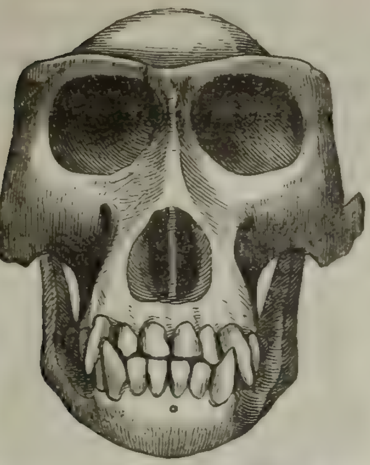


Male.

Female.

FRONT VIEW OF GORILLA SKULLS.

But in the *female* gorilla the canines are not much larger, in proportion to the relative size of the animals, than in the chimpanzee; the frontal and occipital ridges of the head are but slightly marked.

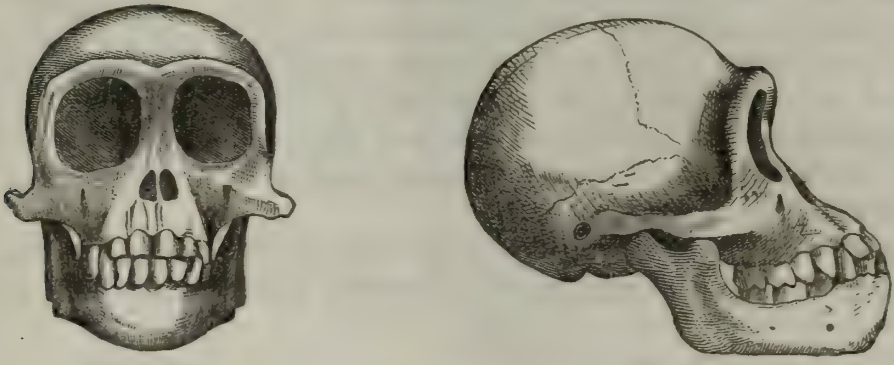


FEMALE OF THE "RED RUMP" VARIETY.

In the female gorilla "with the red rump," the head of which seems somewhat deformed, the space between the eyes is much narrower.

The skulls of the *T. niger*, or chimpanzee, and *T. calvus* (nshiego mbouve) are smaller and rounder than that of the gorilla, and show more capacity relatively to their size than that of the male gorilla, but I think not much more than that of the female gorilla. That of the kooloo-kamba has a greater relative capacity than *any* other of the apes.

The corresponding small amount of brain in the male gorilla, and the excessive preponderance of the cerebellum or back brain, would seem to corroborate our opinion of the excessive brutality of this beast.



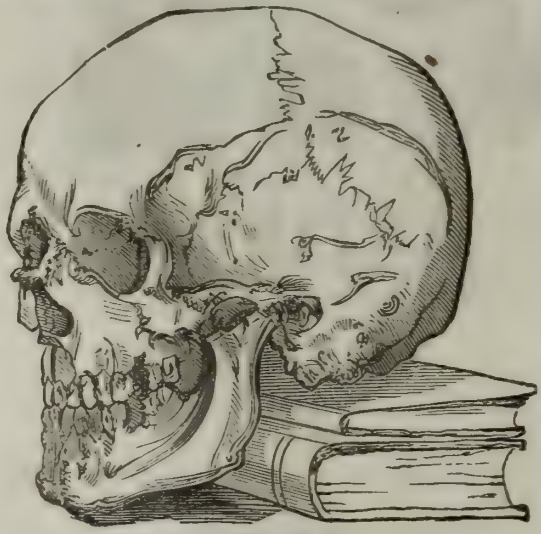
Front View. Side View.

SKULL OF YOUNG T. CALVUS.

The changes which occur in the development of the female gorilla's skull from early youth to adult life are not so great by far as they are in the male gorilla's skull, which may be called a complete metamorphosis.

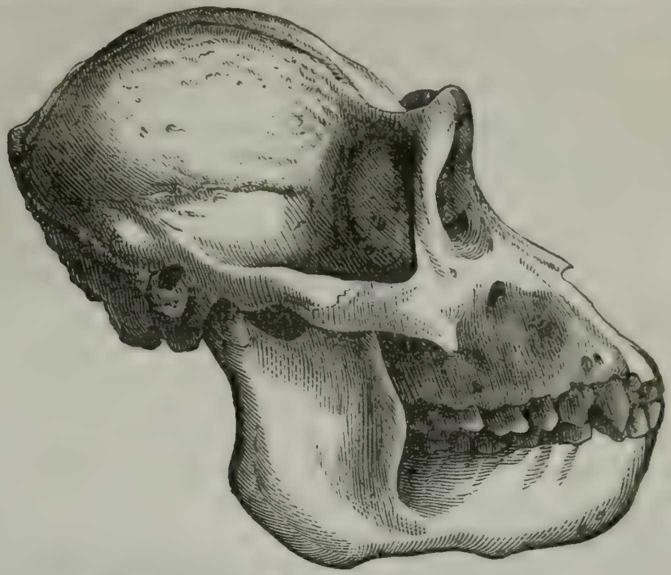
The skulls of *young* gorillas, female and male, and of the young of the chimpanzee and other apes, are much alike, and could hardly be recognized one from another. When young, the head is more round and more human. As the animal grows older, the occiput becomes long and com-

NEGRO SKULL.

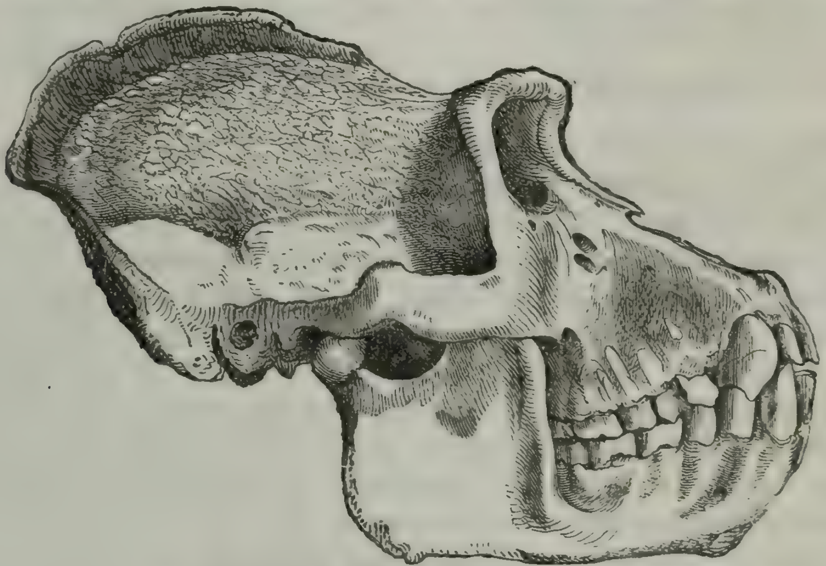


CAUCASIAN SKULL.

pressed; the muzzle becomes large and projecting; the frontal ridge, which was small, becomes prominent; and the crests and occipital ridges, which are not seen in the young, become enormous in the adult male gorilla. This appears to be, as it doubtless is, an effectual defense of the monstrous skull against the dangers of ferocious conflicts.



SIDE VIEW OF A SKULL OF FEMALE GORILLA.



SIDE VIEW OF SKULL OF MALE GORILLA.

By the following table of measurement, the reader can form an idea of the comparative cranial capacity of the different apes of Africa. The measurements are by my friend Professor Jeffries Wyman, of Boston.

CRANIAL CAPACITY OF ADULT CHIMPANZEE, NSHIEGO, AND KOOLOO-KAMBA.

		Cubic Inches.	Authority.
I.	Chimpanzee	26	Dr. J. Wyman.
II.	"	24	"
III.	"	22	"
IV.	Nshiego.	22	"
V.	Kooloo-kamba	25	"
VI.	Chimpanzee	20	"
VII.	Nshiego.	18	"
VIII.	" (young)	21	"

From this it will be seen that the cranial capacity of the kooloo-kamba and nshiego is intermediate between the two extreme measurements of the chimpanzee.

CRANIAL CAPACITY OF GORILLA.

		Cubic Inches.	Authority.
I.	Male	34·5	Dr. J. Wyman.
II.	“	28·3	“
III.	“	28	“
IV.	“	29	“
V.	“	26	“
VI.	Female	29·5	“
VII.	Male	27	Dr. S. Kneeland.
VIII.	“	32	Dr. J. Wyman.
IX.	“	32·6	Prof. Owen.
X.	“	30·3	Dr. J. Wyman.
XI.	Female	25	“
XII.	“	24	“
XIII.	“	29·6	“
XIV.	“ young, shedding teeth.	20·5	“
XV.	Gorilla with red rump	19·5	“

I. and III. were obtained by Dr. George S. Perkins.
II. and XI. were obtained by Dr. T. S. Savage.
VII. was obtained by Rev. J. L. Wilson.
IV., V., VI., XII., XIII., XIV., XV. are from my own collection.
VIII. was obtained by the Rev. Wm. Walker.
IX. is in the Hunterian Museum in London.

Average of ten males	29·70	cubic inches.
“ three females	26·00	“
“ thirteen adults	28·85	“
Maximum	34·05	“
Minimum	24·00	“

No. XI. is deformed, and is therefore not referred to in the averages.

The average weight of the brain of a child of four years, of the Caucasian race, having its first teeth, is 38 to 40 ounces. There are no measurements for this age. The average capacity of the adult Caucasian brain is 92 cubic inches, and the maximum is 114 inches.

The average capacity of the adult negro and Australian brain is 75 cubic inches. The average capacity of thirteen adult gorillas was but 28·85 cubic inches. This is an incontestible proof of the great ascendency of the intellectual life of the human species, even in the lower orders of the human family, which increases gradually, and possesses an activity of nutrition which tends to the continual development of that organ as long as the ossification and the sutures of the cranium are not complete, and which is not the case until man has attained the adult age; while even after that period it is known that the brain increases sometimes in weight.

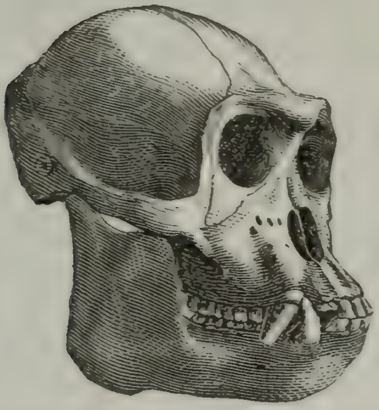
The cranial capacity of a *young* gorilla or nshiego—supposing a subsequent development equal in measure to that in man—would produce an animal of a high grade of intelligence. But this development does not take place. The actual increase in brain, in the adult gorilla, (or other anthropoid apes,) over the young, is very slight. The head increases in size and weight with age; but it is the bones, which grow into a hard, firm brain-case; the brain itself remains almost without increase in weight or size. This proves conclusively that the animal has very limited powers of intelligence; and, from my own observations, I believe that the limit of that intelligence may be reached in a single year of its life.

Comparing the skeletons of the *T. calvus*, or nshiego mbouve, and T. kooloo-kamba with the *T. niger*, it does not strike me that their differences are of generic importance, especially when it is remembered how much individual gorillas differ in size and in proportions.

The skull of the kooloo-kamba is much broader than that of either the chimpanzee or *calvus.* In the kooloo-kamba the incisors strike squarely upon each other, and present a broad, grinding surface.

Measured from the supra-orbital ridge above the eyes backward to the occipital ridge, the plane dividing that section of the skull would have more than one-third of the brain superior to that line. The bis-temporal diameter is greater in proportion than in either the gorilla, the chimpanzee, or the *calvus.*

The kooloo-kamba skull being placed *in situ* upon the lower jaw, the whole head preserves, unsustained, its erect position.


KOOLOO-KAMBA SKULL.

HUMAN SKULL

The peculiar development of the cheek-bones gives a great breadth to the face; the muzzle is not so prominent as in the other apes; the head is rounder; the capacity of the cranium is greater than the nshiego, as shown by the table of measurement of the crania. The skull approaches somewhat nearer in shape to the human skull.

* * * * * * * * *

Dr. P. Gratiolet, in a very able paper, read before the *Société d'Anthropologie* of Paris, on microcephalus considered in its relations to the characteristics of the human race, has the following remarks :—

"The study of the brain of microcephalic persons [or small-brained persons] has provided me with other elements, by the aid of which the absolute distinction of man is evidently and anatomically proved. In comparing attentively the brain of monkeys with that of men, I have found that, in adult age, the arrangement of cerebral folds is the same in one group as in the other; and, were we to stop here, there would be no sufficient ground for separating man from animals in general; but the study of development calls for an absolute distinction."

Speaking of the anatomical development and structure of the brain, he then continues: "In fact, the tempero-sphenoidal convolutions appear first in the brain of monkeys, and are completed by the frontal lobe, while precisely the inverse order takes place in man; the frontal convolutions appear first, the tempero-sphenoidal show themselves last; thus the same series is repeated in the one case from *a* to *w*, in the other from *w* to *a*. From this fact, rigorously verified, a necessary consequence follows—no arrest in the progress of development could possibly render the human brain more similar to that of monkeys than it is at the adult age; far from that, it would differ the more the less it were developed."

Thus we see that, even in the lowest idiots, the brain preserves the material and zoological characters of man; and, though often inferior in appearance to that of the chimpanzee, gorilla, or orang, is nevertheless an undeniable human brain. Disease, or degradation in continued reproduction, (*astheniogeny,*) may dwarf a man, but will never make of him an ape; and, moreover, modern observations have demonstrated that idiots do not breed.

I close this chapter with the following tables of measurements of the gorilla head, carefully made from one of my most perfect specimens, an adult male, which, when first shot, measured five feet eight inches in extreme length.

MEASUREMENTS OF THE GORILLA'S HEAD.

Lower Jaw.

	Inches.
Length of the inferior maxillary bone, from the inferior angle of the ramus to the canine tooth	6
Do. to the median line measured around to a point between the middle incisors	7
Perpendicular height of the ramus of the jaw	4
Greatest breadth of do.	2¾
Length of alveolus (in a straight line of the teeth)	3⅝
Width across the jaw from the outer margin of the last molars	2⅝
Do. do. at the canine or bicuspids	2¼

Upper Jaw.

Length of alveolus from the last molar to the canine	3½
Do. do. around to the median line.	4¼
Breadth across the jaw at the molars	2¾
Do. do. at the extremities of canine	2⅞

Skull.

Diameter of nasal aperture	1¾
Distance from lower margin of do. to the margin of the eye-socket	3
Width of the face, measured across the eyes to the outer margins of the lateral orbital ridges	5½
Width of the face, measured at the molar protuberances	6½
Depth of the eye-socket to the optic foramen	2⅞
Greatest length of the face, measured in a straight line from the summit of the orbital ridge to the lowest point of the chin	7½
Distance from the base of the nose to the top of the orbital ridge on the median line	2½
Distance from do. to the outer angle of do.	3½
Distance on the median line from the middle incisor of the upper jaw to the foramen magnum (spinal opening)	7½
Diameter of the foramen magnum, or spinal opening	1¼
Distance from the posterior margin of that opening to the lateral termination of the occipital crest	3½
Distance on the median line, measured from the middle incisor of the upper jaw, across the spinal opening, to the outer point of the occipital crest.	12¼
Transverse diameter of the base of the skull from the mastoid protuberances	6
Length of the *occipital crest* on its summit	11
Greatest height of this crest, measured perpendicularly from the surface of the skull	1
Length of the *median crest* on the top of the skull	5
Distance from the summit of the orbital ridge to the *point of junction of the crests* on the occiput	7
(Measured from the highest points of the orbital ridge and the occipital junction of the crests, a line will not touch the skull.)	
Measurement around the entire skull, within the zygomatic arch, on the depressed line just posterior to the eye-sockets, and anteriorly to the crests	11
Lateral diameter of the space beneath the zygomatic arches	2
Antero-posterior do. do.	2¾

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Lecture on Dentition and its Derangements. By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics in the N. Y. Med. College.—"In order to complete the anatomical and physiological part of our subject, let me proceed to some remarks on the permanent teeth. You remember, from my previous lecture, what I said, following the description of the process as given by Harrison, on the first formation and development of the temporary ones. Soon after the commencement of the saccular stage of the deciduous teeth, the rudiments of the second or permanent set are developed. About the fourteenth week of fœtal life the deep portion of the primitive dental groove is closed in, and contains the sac and papillæ of the ten milk teeth; the upper or superficial portion of the groove remains open, and is then named *secondary dental groove.* In this commence the rudiments of the permanent teeth. At first a small depression is observable behind the superior openings of the milk sacs; this increases, and forms the *cavity of reserve*. These cavities are lined by an inflection of the mucous membrane, and at the bottom of each a small papilla is formed; they gradually recede from the surface, and are thereby converted into follicles, and finally into closed sacs, which lie to the inner side of, and in close contact with, the former set, and inclosed in the same submucous tissue. The necks of these sacs, by which they originally communicated with the general mucous membrane, continue as obliterated cords leading to the surface of the gum, internal to the deciduous teeth. These cords have been named the *gubernacula* or *itinera dentium*, roads of the teeth, without having, however, any such office as the name would appear to apply. The primitive dental groove, behind the posterior deciduous molar, does not close so soon as the anterior portion, and in it are developed, about the fifth month of fœtal life, the follicle and papilla of the anterior permanent molar. After its follicle has closed, the dental groove closes over it, leaving a space between the gum and the sac of this tooth; in this is a cavity of reserve of mucous membrane for the second permanent molar, and one also for the third molar or wisdom tooth. As the deciduous sacs, as well as the anterior permanent ones, increase in size more rapidly than the bones can elongate, this cavity for the permanent molars is pressed backward into the maxillary tuberosity above, and into the root of coronoid process below; but in a few months after birth, as the jaws increase in size and length, the first permanent molar returns to its proper level in the dental range; the cavity of reserve behind them dilates into the space the first molar occupied, and in it is developed the papilla for the second permanent molar. In the course of time, as the jaws further elongate, this tooth advances and descends, and the remainder of the cavity of reserve dilates behind for the third permanent molar or wisdom tooth.

"The permanent sacs at first receive their vessels from those of the gum, but afterward from the temporary sacs; and as they retire into their own cells, these new vessels enter into new dental canals, which become permanent. In the course of a few years, and after all the temporary teeth have appeared, the further elongation of the jaws admits of space for the first true molar to protrude; this usually occurs between the sixth and eighth years, and sometimes even sooner. At this age there are fifty-two teeth in the two jaw-bones, viz., twenty deciduous teeth, twenty permanent beneath these, and the twelve posterior molars; and when all the anterior permanent teeth have become enlarged they press upon the anterior wall of their alveoli, which soon undergo absorption; and then each tooth comes a little forward into the lower part of the alveolus of the milk tooth; the fangs of the latter are absorbed and gradually wholly removed, and then the crown falls out of the sac and the permanent tooth supplies its place. The cause of the disappearance of the roots of the temporary teeth is sought for in the loss of nutrition from the pressure of the *subjacent* permanent tooth, and perhaps in contemporaneous increase in the general injection and nutrition, bringing on liquefaction and absorption. Some pressure is necessary, at all events, for whenever there is no pressure from below, the temporary tooth is not removed. But you must not imagine that the permanent tooth exercises any immediate pressure on the blood-vessels, thereby depriving the temporary tooth of its nutrition; if this was the case, the permanent tooth would exercise just the same influence at a much earlier period, even while the temporary itself was not fully developed. The crowns of the permanent molar teeth, further, are perfectly unable to exercise any pressure on the blood-vessels of the temporary, as they are situated between their roots. The nutrition of the temporary teeth is impaired by two facts, first by the increasing development of the permanent themselves, and further by the development of the maxillary bones, which contract and partially obstruct the canals through which the branches of the maxillary artery penetrate to the tooth. The pressure of the permanent tooth on the temporary one is not at all direct; nor is it necessary that it should be so. Nature usually, in building up and destroying, works very slowly and invisibly. A fine instance of what a slight pressure for a protracted period may effect, and how bones are absorbed from the pressure of a slight physical influence, is given in the fact, that aneurisms of large arteries at some parts of the body, where they are in the neighborhood of bones, destroy the bone by slow gradual absorption. Thus aneurisms of the aorta are reported to have produced absorption of part of some spinal vertebræ, and I have myself seen two or three costal cartilages absorbed from the constant hammering against the chest by a large aneurism of the ascending aorta. You see, therefore, that the pressure of the permanent tooth inclosed in its cell, on the wall separating it from the temporary tooth, it being slowly and continually forced upward, may be deemed sufficient to bring the root of the temporary tooth to absorption. The effect of the permanent teeth is not in one direction only, for you know that the permanent teeth are not situated in the same horizontal line; the steady slow pressure is exercised upward and laterally, thus the roots of the molar teeth are absorbed on their inner sides; and the middle permanent incisors press not only on the corresponding temporary, but the lateral ones also. The root of the temporary tooth, while being deprived of its normal nutrition by pressure exercised on the periosteum, is liquefied by the increased action in the surrounding parts, brought under the influence of the numerous absorbent vessels contained in the sac of the onward growing tooth, and excreted like so many other effete matters. The vessels rendering this service to the organism have been made the subject of particular study by Boardet, who called them 'appareil dissolvant,' and Delabarre, that learned humbug, and nostrumseller, who comprehends them under the name of 'appareil absorbant.' This resorption can take place as long as the root is in some connection with the surrounding parts. If it ceases to be so, the vital powers of absorption are replaced by another; in this case the root has the general effect of a foreign body brought by some means or other into contact with and imbedded in the organism, to produce inflammation and to be removed by suppuration. Thus no resorption takes place even when the crown of the permanent tooth comes into immediate contact with the root of the temporary; in which cases the temporary teeth, particularly the molar, are found to be turned over and produce, by the effect of their sharp roots, deep ulcerations in the cheek, which will not heal before the temporary tooth is removed.

"The permanent teeth appear no more nor less at regular periods than the temporary ones. About the seventh year, or earlier as I mentioned before, the first permanent molar appears, nearly about the time when the first temporary incisors are replaced by the permanent. After all the incisors are changed, the anterior and posterior temporary molars are successively shed and replaced by the permanent bicuspides; the canines are changed about the tenth or eleventh year. About the twelfth or thirteenth the second permanent molars appear; the last molars, or wisdom teeth, usually some time between the twentieth and thirtieth.

"Ossification* requires but a short time in the deciduous teeth, and longer in the permanent. A permanent incisor requires seven years, a canine twelve, a molar from eight to ten years. Ossification commences at the very same time in incisors and the first molars, as is proved by the dissection of the jaw-bones of infants who died in the first months after birth. It progresses more rapidly in the female than in the male sex; girls, therefore, have their permanent teeth sooner than boys.

"In the lower jaw of a child three years of age, the permanent teeth are still in an oblique direction. Only the middle incisors, which are the highest, are in a nearly vertical position; the lateral incisors are situated more inward, and more obliquely; the lowest are the canine teeth. Higher, and between the roots, we find the molar teeth in their first stages of development, or rather the first one; for as to the second, we find nothing but the cells in which it will be contained in future. The time of its first formation is about the fifth year. As it requires about eight years for its complete ossification, it makes its appearance about the thirteenth year of life. The commencement of ossification in the third molar tooth, and particularly its appearance, is more uncertain, as it depends on local circumstances. It does not usually appear before the twentieth year, but in some cases, according to C. Harris, does not show itself, until the thirtieth or even fortieth year, and Canton extracted one for a gentleman seventy-four years of age, who informed him that it was not out until he had attained his seventieth year.

"The maxillary bones of a child of from four to five years contain so many and so large cells for both the temporary and permanent teeth, that but very thin osseous walls form a bridge between the external and internal wall of the jaw-bones. Nevertheless, every tooth, both temporary and permanent, receives a ramification from the common maxillary blood-vessels and nerve. There is sometimes, according to Delabarre's observation, an anomaly in the lower jaw, of this sort, that the submaxillary artery and nerve, right at their entrance into the lower maxilla, divide into two branches, one of which feeds the temporary, the other the permanent teeth. The periosteum of the alveolar cell, being a mere continuation of the external periosteum, takes its blood-vessels from the maxillary artery, branches of which penetrate the porous osseous substance.

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* Odontification?—Z.

"A very interesting subject relating to our investigations is that of the so-called third dentition. Is there at all a third dentition? Are those teeth which we are used to call permanent, not permanent, but subject to be temporary only in proportion to those which are to be as it were more permanent? Certainly there are a number of cases reported, in which the teeth are said to have fallen out twice, and to be replaced twice. There is one case even of the following description: In a girl the first replacement, the second dentition, took place at six years, the third dentition at twelve; this latter was complete in a single year. This case, our author says, 'is highly interesting for two reasons: first, because it occurred in a young individual, while cases of third dentition have been hitherto related of old people only; second, because all the teeth were replaced here by others, while the third dentition has always been incomplete, and limited to the appearance of two or three teeth only.' The case, gentlemen, looks so very interesting and beautiful, that I am afraid the reporter is greatly mistaken, or has been grossly imposed upon. Other cases of third dentition are reported, but scarcely any of such a remarkable kind as this one. At all events, we require a good deal of belief in the veracity or the judgment of a writer, if we are to take as scientific facts such reports as are in open conflict with the known laws of anatomy and physiology. W. Jackson has the cases of a man of sixty-four, and of a woman of eighty years, in whom a third set of incisors was observed; in one of them the old teeth had just fallen out to make room for the new ones. Sorgoni reports the case of a boy exhibiting a third dentition before he was twelve years of age, and Andral has collected from literature twelve cases of the same anomaly. Lison reports the case of a boy, Eugene Cavillan, thirteen years old, of young and healthy parents, of good constitution and well, and without any anomaly in his general development. The second dentition took place when he was nine years old. Soon after, all his twenty-eight teeth were replaced by others; the same occurrence took place between his tenth and eleventh year, and again between the eleventh and twelfth. When the case was reported by the author, the boy was said to be in his thirteenth year; at this age a new set of teeth was being developed; the first inferior molar tooth of the right side fell out, to give way to another that was already visible. The teeth that had fallen out had no roots, which appeared to be eroded. The removal and replacement took place always in the usual order, the teeth being small, white, and of normal shape and position. The gums were red and somewhat tumefied, and the general health of the boy satisfactory.

"I consider it a characteristic occurrence that curiosities like those alluded to are more numerous in old, very old books, than in modern one. Storch, alias Pelargus, who wrote in 1750, reports the case of a lady of seventy years, who, after having lost all her teeth for a number of years, had a new incisor at that advanced age. He further has the case of his own daughter, who cut five molar teeth in her twentieth year; lost them all, and had new ones in their place when she was thirty-eight years old. Before this time, our author says, the lady was always sick from this abnormal teething—the symptoms enumerated, however, being evidently of uterine and hysteric nature; but after the last teeth cut, she became healthy, and strong, and fat. Old Paulinus relates the case of a Countess of Detmond, who lived up to a third dentition, in 1589, and grew one hundred and forty years old. The younger Pliny has the observation of the last molar tooth appearing at eighty years of life; Schottus at forty years, in a physician of his acquaintance; Cardanus, the celebrated mathematician and inventor of the Cardanian Formula, is reported to have cut a tooth at forty-three; several soldiers at forty-three, forty-four, and forty-five; several others, according to Sennertus, at sixty-three, seventy-five, eighty, eighty-one, eighty-eight, even at one hundred and four years of age. In an old book of 1725, there is the case of a woman of sixty-six years, who got not only new teeth, but new brown hair, instead of her former gray. Johannes G. Slevogt reports, in 1733, the case of a captain who cut new teeth at ninety-four years of age, and died soon afterward; we do not learn whether the old man died in consequence of teething, or whether, if he had not teethed again, he would not perhaps have lived up to our times, and been still older than ninety-four. But the greatest curiosity I have ever been able to hunt up is the following, reported by Möllenbroc, a century and a half ago. There lived at Leipsic a noble lady who had five children; with every confinement she cut a molar tooth. As soon as one of her new teeth got loose, the child who was born at the time when it was cut, was affected with some severe disease. If such a tooth fell out, she was always certain that the corresponding child was surely going to die. And so it happened, adds our honest author, all the three children died before the mother. Thus you perceive, gentlemen, that as it is said to be customary now-a-days that children die from their own teething, it was customary for children in olden times to perish from the dental troubles of their mothers.

"Both Courtois and Aimonino have published cases in which a third dentition took place after the permanent teeth fell out; Courtois is of the opinion that the third dentition is observed in the incisors only. If such was the case, why, we must expect that the teeth of the third period were formed contemporaneously with those which were then eliminated by the growth and onward pressure of the subjacent ones. At all events, the belief in a third dentition was so general formerly that decayed teeth would be removed in the hope that a replacement would take place. Professor Nessel, whose name I have mentioned before, has observed a girl whose middle upper incisors had been extracted in the hope that they would reappear. But not only no new teeth appeared, but the space in which two teeth had been seated formerly was so much intruded upon by the neighboring ones, that but one artificial tooth found sufficient room afterward. Now, what nature will not do in youth, she will hardly succeed in doing in old age, where all the reported cases of third dentition are said to have occurred. There is less probability of new germs of teeth forming and developing themselves in advanced life, than that there have been from the beginning supernumerary teeth; instances of which have been reported by Ruysch, besides those enumerated in my second lecture.*

"The fact that teeth will protrude, sometimes, at old age, is undoubtedly true. Instead of being, however, the symptoms of a renewed power of reproduction, they are, in Professor Nessel's opinion, frequently the results of regressive life; as they become visible after the diminution of the alveoli, and the decrease of the thickness of the gums. Such teeth were always formed, but were either invisible from being sometimes incuneated like the canine, or from being covered by an osseous mass, like the wisdom teeth. The second molar tooth, particularly, has been observed to reappear in advanced age, but only after the temporary second molar had kept its place, and fallen out at a very advanced period of life. It is not a very rare occurrence that the temporary second molar tooth remains at its place up to the fortieth year, and thus there can be no mystery nor wonder about the fact that another tooth will make its appearance afterward.

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* Dental Cosmos, vol. ii. p. 401.

"The temporary second molar tooth, however, is not the only one that will remain for a long period, and thereby retard the second dentition. Linderer reports the case of a girl who had her first permanent molar tooth with her eighth year, but whose second dentition did not begin before the fifteenth year. Another healthy and robust girl of fourteen years, who never had the four upper incisors, had all her other milk teeth, yet without there being any probability of an approaching change. Murat has the case of a robust young man of seventeen, who had all his milk teeth but five; and Bird and Maingault report similar cases. Other cases are noticed, by Linderer, of single milk teeth remaining up to the thirtieth or fortieth year; and Riecken gives the history of a man of eighty-five, who cut a number of incisors and molars, and is said to have suffered during his cutting a molar in his left lower jaw, from cerebral congestion, which was relieved, after local depletion had no effect whatever, by spontaneous hæmorrhage from the inner angle of the eye. Finally, a woman of forty-three years was observed by Düntzer, who had all her milk teeth left. After she had been suffering from intense pain in her head and upper jaws, from swellings of the gums, and diarrhœa, four teeth protruded behind the upper incisors; they were smaller and sharper, and troubled the functions of both mastication and articulation. After the lapse of a year, the same symptoms were observed in the right lower maxilla, which never had any molars before.

"Kneisel reports the case of a lady who reproduced four inferior incisors in her fifty-fourth year, after having worn artificial teeth for some time; and a right upper incisor, in place of one that had just fallen out, two years afterward. The teeth which had fallen out were undoubtedly the temporary ones that had never been removed, and finally fell out at an advanced age from being either pressed upward mechanically, or being decayed; nobody can say which, as the report does not contain anything beyond the facts I have related. Professor Hessel has the case of a lady who cut a fine white canine tooth at fifty years of age. This tooth became more visible from year to year, not because of its growth, but because of the decrease of the alveolar margins of the maxillary bone. It had been, in his opinion, always formed and ready to protrude, and would have done so but for the other teeth occupying the space naturally designed for it. The same author reports in his book on dentistry (1856) the case of a gentleman of thirty years, who still had his temporary upper incisors."—(*Amer. Med. Times.*)

"*On the supposed Influence of the Cementum in sustaining the Vitality of Transplanted Teeth.* By CHARLES VASEY, ESQ., L.F.P.S., Glasg., Dentist and Lecturer on Dental Surgery to St. George's Hospital.—The preparations in the Hunterian Museum that illustrate John Hunter's experiments of transplanting the teeth are of the greatest interest, as leading to a scientific solution of a result, hitherto unexplained, arising from certain accidental injuries of the teeth, and operations performed on them.

"Professor Owen says: 'In growing teeth, with fangs not fully formed, the cement is so thin that the Perkinjian cells are not visible; it looks like a fine membrane, and has been described as the periosteum of the fangs; but it increases in thickness with the age of the tooth, and is the seat and origin of what are called exostoses of the fang, which are wholly composed of it. These growths are subject to the formation of abscess and all the other morbid actions of true bone.'

"'It is the presence of this osseous substance which renders intelligible many well-known experiments of which human teeth have been the subjects, such as their transplantation and adhesion into the combs of cocks, and the establishment of a vascular connection between the tooth and the comb. The appearances which the Hunterian specimens of these experiments present, and of the reality of which Professor Müller satisfied himself during his visit to London, are no longer perplexing, now that we know that the surface of the tooth in contact with, and adhering to, the vascular comb, is composed of a well-organized tissue, closely resembling bone.'

"Now, if the union of transplanted teeth depends on the presence of the cementum, we can scarcely be prepared for the account of Hunter's experiments given in the catalogue of the College of Surgeons, or in Hunter's work on the Teeth, wherein he says: 'I may here just remark that this experiment is not generally attended with success; I succeeded but once out of a great number of trials.' It cannot for a moment be supposed that Hunter could overlook a difference in the mode of conducting his experiments that would account for his non-success in so many cases. We must therefore look, for the success of the one case, to some principle not recognized by Hunter, and this, I believe, will not prove to be the presence of the cementum.

"Before I had the opportunity of examining the Hunterian preparations, I felt certain that the tooth in the one successful case was a young tooth—that is, a tooth in which the root is not fully formed, the pulp cavity large, and the formative pulp present; and such I really found it to be. Yet such a tooth, as Professor Owen says, has little or no cementum, that substance being like a thin membrane in growing teeth. The very reverse is found in the preparation in the museum mentioned by Hunter as unsuccessful; the tooth in it is more fully formed, and the cementum proportionately greater; yet union has not taken place.

"Careful consideration of the whole subject of transplantation of the teeth, and considerable practical experience of cases of reunion, have thoroughly convinced me that the successful cases depend on the presence of the two formative organs, namely, the internal or dentinal pulp, and the external or cemental pulp; and that in all cases in which these are not present, or in which ossification is nearly complete, successful results are not to be anticipated.

"By this reading of Hunter's experiments we can understand necrosis as a result of slight injuries to the teeth, and shall also be able to avoid such a result in operations performed on them for the purpose of improving their relative position.

Fig. 1.

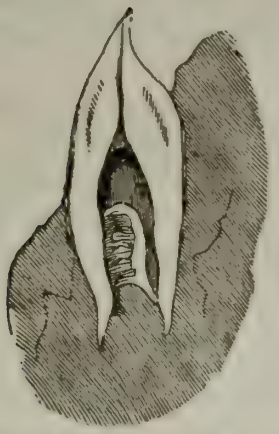


Fig. 1, the tooth of the Hunterian preparation, No. 47; the successful case of transplantation.

Fig. 2.

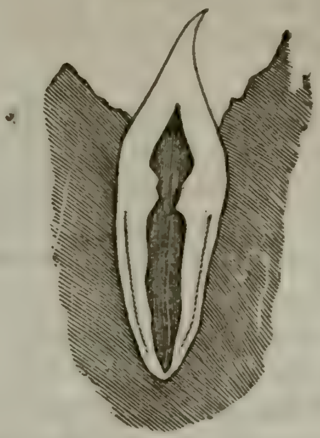


Fig. 2, the tooth of the Hunterian preparation, No. 49; the unsuccessful case of transplantation.

(Sketched from the Hunterian preparations, by permission of the Council of the Royal College of Surgeons.)

"Necrosis, as a result of slight injuries to the teeth, is of every-day occurrence, and is brought about in the following manner: after a blow from a fall or otherwise, the tooth loses its vitality, and gradually becomes of a dark color. In many cases, the gum and alveolar process are absorbed, when the tooth loosens and has to be removed. This absorption occasionally commences at the apex of the fang, and the tooth seems to be retained in its place for a time by a band of gum covering only a portion of the root of the tooth.

"Now, if the cementum were sufficient to support the vitality of a tooth, this unfavorable termination of a slight injury would not so frequently occur. Such cases, I believe, are best explained on the principle that ossification of the pulp, having progressed to that stage in which the aperture leading to the pulp cavity is at its minimum, the vessels, being ruptured by the force applied, recede, and cannot reunite.

"This view of the subject is also proved conversely by the fact that a tooth may be entirely removed from its original position without detriment, provided its removal be effected gradually. This is well illustrated by the following case, which is one out of many similar to it that might be given:—

Fig. 3.

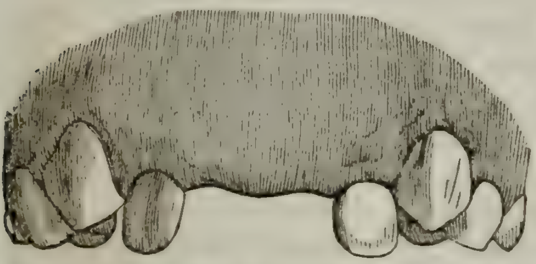


Fig. 3. Drawing from the mouth of a boy who lost the central incisors from a fall.

Fig. 4.

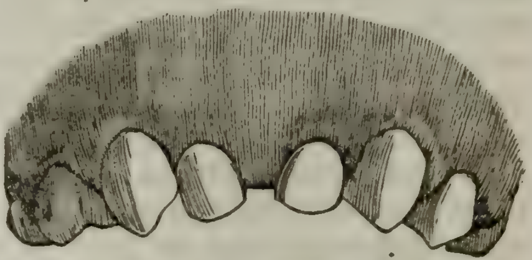
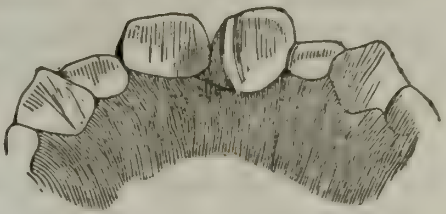


Fig. 4 shows the space nearly closed, the lateral incisors having been drawn together, by elastic cord, nearly into the position previously occupied by the central incisors.

"Among the operations that have been recommended and performed on the teeth, there is one almost identical to transplantation, and depends for success on the same principles. This operation is the seizing a misplaced tooth with the forceps, and at once turning it into its proper position; the tooth is then secured by ligature, or some mechanical contrivance previously prepared for the purpose. This proceeding has been recommended in cases of torsion, such as are represented by FIG. 5.

FIG. 5.



"Such an operation should never be performed when the development of the tooth has proceeded beyond a certain stage. And as there are no physical signs of the stage of development in any one individual tooth, I consider it to be questionable practice ever to resort to it. A slight mechanical contrivance, similar to the one used to retain the tooth in its new position, would prove sufficient to move it gradually, if an elastic ligature be used. The object sought would also be gained in nearly the same space of time as is required for the refixing of the tooth when forcibly turned.

"Faith in the power of the cementum to support the vitality of the teeth I believe to have led to errors in our practice. A correct reading of Hunter's experiments in the transplanting of teeth will suggest to every dentist such modifications as will lead to a safer and more uniform result."—(*Lancet.*)

"*New Anæsthetics—Theory of their Action.* BY CHARLES T. JACKSON, M.D.—Substitutes for ether, as anæsthetic agents, are frequently proposed, and some of them have been practically introduced, with some success. None, however, surpass ether in the two most important qualities of efficiency and safety, and there can be no doubt that with respect to safety, ether is far preferable to any and all anæsthetics thus far discovered.

"It may prove interesting to the profession to inquire into the mode of action of the class of bodies known to produce anæsthesia, when inhaled. This subject has been very carefully studied by me from the outset of anæsthetic practice, and with a view to the discovery of some general law.

"The first impression among physicians was that the anæsthetic state was merely one of temporary intoxication.

"Secondly, the theory of high excitement, followed by corresponding collapse, accounted for the phenomena. Dr. John C. Warren took, at one time, this view of the matter, and spoke of etherization as 'devouring the sensibility by high stimulation, and hence a corresponding nervous depression,' which was the anæsthetic state. Others have supposed that etherization produced a partial asphyxia; hence the expression early made use of by some of our surgeons, that there was 'little difference between hanging, drowning, and etherizing.'

"It has also been alleged that ether absorbed into the sanguineous circulation affects directly the nervous filaments, either at their origin in the medulla spinalis, or in their distributed extremities, or in both these parts. In support of this allegation, it was cited that the direct application of ether to an exposed nerve *destroyed* its sensibility. By the italization of that word, I call attention to the difference between the anæsthetic state of temporary suspension of sensibility, and the destruction of it; for the nerve acted upon directly by ether does not recover its powers, but is permanently paralyzed.

"Another state of the circulation has been observed, which it was hoped would give some clue to the action of anæsthetic agents—namely, that of slackening, and even temporarily wholly suspending the circulation of blood in the capillary or extreme vessels. It was supposed that by thus cutting off a supply of circulating blood stimulus to the sentient extremities of the nerves, sensation was temporarily suspended. The commencement of insensibility in the remote extremities, the feet, legs, and hands, seems to indicate that sensation was suspended at those points first.

"The French physiologists, Flourens and Longet, are of opinion that the effects of anæsthetics commence, and primarily act on the great nervous centres, the medulla spinalis and medulla oblongata; and that if the full effect reaches the bulb of the medulla, death will take place from total suspension of all the vital functions of the body.

"A more chemical explanation of the action of anæsthetics is, that they all abstract oxygen from the blood, and hence reduce its peculiar stimulating powers on the nerves, and that some of them leave poisonous products, while those left by others are innocuous. Thus, as we have formerly stated, chloroform or the ter-chloride of formyl abstracts three equivalents of oxygen from the blood, but, at the same time, unfortunately it deposits, in exchange for the oxygen, three equivalents of chlorine.

"Bi-sulphide of carbon, one of the most terrible anæsthetics ever proposed, the dangerous effects of which I have experienced, and have warned the public about seasonably, acts as a powerful de-oxidizer of the blood, both the carbon and the sulphur abstracting oxygen, the first producing carbonic oxide or carbonic acid, while the latter forms sulphurous acid. Carbonic oxide and sulphurous acid are poisons, as is also chlorine, before mentioned.

"All the acidiferous ethers when decomposed, as they are, in the organs of respiration and circulation, leave their acids in combination with the blood; hence, nitrous and nitric ether are known to destroy life, and hydro-chloric ether and chloride of hydro-carbon undoubtedly act in the same way, and injure the quality of the blood. Acetic ether is not objectionable, since an organic acid is easily decomposed in the processes of respiration, and is removed in the form of carbonic acid and vapor of water, usual products of normal respiration.

"Sulphuric ether, as it is improperly called, since it does not contain any sulphuric acid, is a pure hydro-carbon, with one equivalent of oxygen $=C_4 H_5 O$. When decomposed by the action of the blood, it may be converted into aldehyde, acetic acid, and lastly into carbonic acid and water, no fixed product remaining in the blood, but all able to be removed by respiratory action. The odor of the breath of a patient who has been etherized, shows that there are exhaled the oxidized products of the ether, and it is known by analysis that a much larger proportion of carbonic acid is exhaled from the lungs, during the etherized state, than in the normal condition of the system.

"Without finally adopting any theory of the chemical and physiological action of anæsthetics generally, we may, perhaps, be allowed to call attention to a general law, namely, that all very volatile hydro-carbons act as anæsthetics, like the others. Thus, it has long been known that benzine, benzole, oil of turpentine, naphtha, when inhaled, will all produce the anæsthetic state. The highly volatile oils of coal tar, likewise, possess anæsthetic properties, and one which has recently been tested in surgical practice, known as keroselene, a highly volatile naphtha, seems to be the least offensive of them. It is evidently a very pure hydro-carbon, analogous to highly rectified naphtha, and does not contain any oxygen, as is proved by its property of preserving potassium from oxidation, when it is immersed in it. The first samples of keroselene which I tested, two years ago, proved quite irritating to the organs of respiration; but I have learned recently that a purer and more volatile product has been made at Mr. Downer's works, though I have had no opportunity of testing it practically.

"It is obvious that there are two or more volatile oils in the keroselene of commerce, and they are separable by graduated distillation. Some care, therefore, is requisite in the preparation of a uniform product; one which may be properly the subject of experiments by inhalation. I would observe that no analysis has yet been made of the keroselene oils."—(*Boston Med. and Surg. Jour.*)

"*Remarks on Dentistry in the Army.* BY WM. B. ROBERTS, M.D., of New York.—The sad misfortunes of the Crimean war, owing to imperfect attention to the sanitary condition of the British army, opened the eyes of the whole civilized world to the importance of a proper sense of duty in this connection. It is not surprising, therefore, that humane and far-seeing men in this country should have taken an early opportunity in the present campaign, to press upon the government the almost incalculable importance of great care in the superintendence of the sanitary department of the army. Thus every effort is being made to attach to each regiment all the requisite force with all the necessary equipments to perform the work given to them in an efficient and satisfactory manner. There is probably very little to be said in the way of advice to such gentlemen as are thoroughly imbued with the importance of the subject, and as thoroughly acquainted with all the means and appliances necessary to it; but there is one point which has apparently escaped the attention of persons in authority, on which we wish to say a few words. During the last twenty years, and owing principally to the efforts of our own countrymen, dentistry has become elevated from a mere branch to a distinct science. Colleges have been founded, societies formed, conventions held, professorships endowed, and all to give the greatest insight possible into the structure, physiology, and pathology of the human teeth. It has been found, as men progressed in the study of these organs, that their disease spread its ramifications through the whole animal economy; all the functions of the body have been affected, and indeed suspended by the existence of a foreign and improper condition in the teeth; the whole sanitary condition has been altered, and the most serious complications of disease have attended the existence of diseased teeth.

"Thus dentistry has been taken out of the hands of the surgeons and doctors, and has formed a separate profession of enlightened, educated, and scientific men, understanding as a necessity not only their own immediate calling, but also no small share of surgery and pathological anatomy. A few years since, the question was raised in England as to the propriety of attaching dentists to the British army and navy; a great deal had been said upon the subject, and it was well known that the teeth of the soldiers and sailors were in a deplorable condition; but after a temporary prospect of success the subject was dropped. Meanwhile, in the French army, with that sense of decency that always characterizes the French nation, means had been taken to extend a proper attention to the wants of the body, and to the teeth; the men were supplied with brushes, and compelled to keep their teeth cleaned; and thus the matter stands in Europe at the present time. We have referred to this subject at the present time because it seems to us that it is proper that here, where dentistry has progressed more than in any other country, it is right that the first steps should be taken to still further advance it. And we desire especially to show the value that it might possess as a sanitary instrument, if proper efforts were made to invest it with the importance it deserves. It is almost needless to refer to the necessity for having good teeth in our army and navy—first, for mastication; and, second, but most important, for their effect upon the general health; and upon this last subject we desire to give some information.

"Careful mastication is essential to perfect digestion, and this latter, more especially in the active life of the soldier or sailor, is a primal necessity for healthy existence.

"Very few persons are aware of the derangements which may be produced by diseased teeth, although the period of dentition in children is generally considered as one of the most critical in life. It is, indeed, estimated by some writers, that one-tenth of all the deaths in the world occurs during the period of the first dentition. The animal frame is in infancy so delicate, that the least local irritation produces a sudden and universal sympathy throughout the whole body. Fever is a very frequent accompaniment of teething; also an affection of the skin, resembling measles; pustules sometimes appear, not unlike a mild form of small-pox; diseases of the scalp, diarrhœa, convulsions, diseases of the lungs; and in fact, symptoms of nearly every form of disease may be met with during the period, and resulting from dentition. If we know that this terrible catalogue of evils is attendant upon the growth of the teeth during infancy, is it not rational to suppose that a healthy condition of these organs is essential to adults, when we consider the close connection existing between the teeth, alveolar process, the parotid, submaxillary, and sublingual gland, on the one hand, and the mucous membrane of the mouth, which is continuous with that which lines the pharynx, œsophagus, stomach, and intestines, on the other? It is well known to the dental practitioner, the physician and surgeon, that if a tooth becomes diseased, all these organs will to a certain extent sympathize with it, independent of the agonizing and excruciating pain caused by the exposure of the nerve. Cases have been given where inflammation of the mucous membrane has extended so far as to produce consumption; while dyspepsia with all its attendant horrors may be, and often is caused by improper and insufficient mastication, which must necessarily result from the possession of poor and imperfect teeth. Neuralgia and *tic-douloureux*, probably the most fearful pains which the human race ever suffers, often proceeds in the first instance from exposed nerves; and other acute and chronic inflammatory diseases frequently spring from carious teeth and diseased gums, ruining health, and disabling their victims from performing even the most simple duties of life; and in the case of the soldier who is exposed night and day to every variety of inclement weather, and every quality of fare, the chances of such diseases establishing themselves through the means of diseased teeth are greatly multiplied.

"It is well known to the dental profession that all the diseases common to teeth can not only be cured, but may be prevented by proper and timely treatment. After having thus enumerated the evils appertaining to a defective condition of the teeth—a condition which experience has found to exist among the army to an extraordinary extent, and having shown the importance of such diseased condition being avoided and changed to aid in establishing a proper sanitary condition among these men who risk their lives for their country's service, and have neither time, means, nor opportunity for themselves discharging their duty in this respect—we desire to urge upon the proper authorities, that a corps of dentists, or dental staff, should be attached to the United States army, similarly organized with the surgical department, who would act in connection with, and as an efficient aid to, that department, besides performing their own duties in a proper manner. Holding this to be a great sanitary measure, as well as an economical and humane movement in behalf of those affected by it, we would especially offer these suggestions to our 'Sanitary Commission,' believing that in the scope of their noble field of labor there could not be performed a more important act than the procuring of the passage of a bill through Congress, at the approaching session, which should incorporate into the army an efficient dental staff, strengthened with all the powers necessary to enable it to become most serviceable to the cause of health."—(*American Med. Times.*)

Staphyloraphy, etc., performed by MR. FERGUSSON at King's College Hospital.—"A young man then entered the theatre with a fissure extending through the soft palate and a small portion of the hard palate. Staphyloraphy was performed with complete success. There was at first a little more sensitiveness of the parts than is usually witnessed in these deformities, but it soon passed away, and the operation was readily completed. We recollect the case of a girl upon whom staphyloraphy was performed by Mr. Fergusson, on the first of December last, for cleft palate. She had previously been operated upon for hare-lip. On the occasion now referred to, however, she evinced astonishing moral and physical courage, for during the entire time she scarcely stirred; and the operation was finished in the most satisfactory manner, and a cure resulted. This was the ninetieth case of staphyloraphy performed by Mr. Fergusson, and out of that large number three only proved unsuccessful, as we heard him state in January; and that was not the fault of the operation itself.

"The fourth case was a boy aged ten years, in whom there was loss of substance of the left side of the lower lip near the angle, with adhesion of the lip to the gums, and exposure of the gums and teeth, the result of a former attack of cancrum oris. The deformity was not only unsightly, but gave rise to more or less constant slabbering. It was remedied by a sort of plastic operation, which consisted in the paring of the edges of the cicatrized part, loosening the adhesions between the chin and gums, and making an incision through the left part of the chin to relieve any traction, as well as to permit of the elevation of the left lower lip. The semicircular wound thus made was closed with hare-lip pins. If nothing occur to prevent union of the parts, the deformity will be much lessened, and the inconvenience of slabbering wholly obviated. This operation was done under the influence of chloroform."—(*Lancet.*)

"*On the Properties of Liquid Carbonic Acid.* By GEORGE GORE, Esq.—In this communication the author shows how a small quantity of liquid carbonic acid may be readily and safely prepared in glass tubes closed by stoppers of gutta-percha, and be brought in a pure state into contact with any solid substance upon which it may be desired to ascertain its chemical or solvent action, or be submitted to the action of electricity by means of wires introduced through the stoppers. By immersing about fifty substances in the liquid acid for various periods of time, he has found that it is comparatively a chemically inert substance, and not deoxidized by any ordinary deoxidizing agent except the alkali metals. Its solvent power is extremely limited. It dissolves camphor freely, iodine sparingly, and a few other bodies in small quantities. It does not dissolve oxygen salts, and it does not redden solid extract of litmus. It penetrates gutta-percha, dissolves out the dark-brown coloring matter, and leaves the gutta-percha undissolved, and much more white. It also acts in a singular and somewhat similar manner upon india-rubber. The india-rubber while in the liquid acid exhibits no change, but immediately on being taken out it swells to at least six or eight times its original dimensions, and then slowly contracts to its original volume, evidently from expansion and liberation of absorbed carbonic acid, and it is found to be perfectly white throughout its substance. These effects upon gutta-percha and india-rubber may prove useful for practical purposes.

"The liquid acid is a strong insulator of electricity; sparks (from a Ruhmkorff's coil) which would pass readily through 9–32ds of an inch of cold air would with difficulty pass through about 1–70th of an inch of the liquid acid.

"In its general properties it is somewhat analogous to bisulphide of carbon, but it possesses much less solvent power over fatty substances."—*Proceedings of the Royal Society*, in *Chemical News*. (*Dublin Med. Press*)

MISCELLANY.

The Paris correspondent of the *Lancet* says that M. C. Robin has made a report to the Acad. of Med. "on an interesting paper of M. Sucquet, pointing out certain modes of direct anastomotic communication between the smaller arteries and veins, hitherto unnoticed by anatomists. M. Sucquet has, by means of injections, (all of which have been repeated by the reporter,) shown that, independently of the capillary continuity of circulation, there exist in different regions of the body certain constant and determined connections, by means of transverse branches, between the small arteries and veins, which can be observed without the aid of the microscope. This method of vascular communication had been already noticed in the skin of the batrachians by M. Fred. Dubois, but its occurrence in the human body was unknown. M. Sucquet has also called attention to another curious anatomical fact, also new to science—namely, that in other cases a small artery, instead of breaking up into terminal branches like its neighbors, may be seen simply to make a bend upon itself and return parallel to its original course, having become a vein, and increasing in size as other veins, neighboring veins come to inosculate with it, when it is constituted the principal afferent vessel of the part. The regions in which the above vascular peculiarities have been noticed are, the skin of the fingers (more especially at their tips) and of the thenar eminence of the wrist; also in that of the elbow; on the surface of the aponeurotic expansions of the extensor tendons; on the ligaments of the hand, wrist, and elbow; in the skin of the toes and soles of the feet; in the skin of the knee, round the patella, where filiform arteries accompanied by veins, with which they communicate freely, abound; on the surface of the tibio-tarsal ligaments and of those of the knee-joint; in the skin of the lips, nose, eyelids, eyebrows, and ears; in the mucous membrane lining the nasal fossæ; and, lastly, in that of the tip of the tongue. The knowledge of the above facts must be most precious to the physiologist; and although their application and bearing can hardly at present be estimated, yet we may look upon M. Sucquet's investigations as a most important step toward a clearer insight into those mysterious laws which regulate the nutrition and repair of the tissues, and the maintenance or restoration of circulatory equilibrium."

In the clinical report of Guy's Hospital (*Lancet*) it is stated that an interesting example of epulis encroaching upon and entering the antrum has recently been under the care of Mr. Bryant. "It occurred in a young woman, aged twenty-four, who had noticed a tumor in her gum, on the left side over the bicuspid teeth, for a month. The growth being somewhat rapid, removal was suggested; and, having excised the tumor of the gum, it was found to dip upward and backward into the antrum; with the handle of the knife this was, however, readily scooped out, and the cavity left quite clear. A speedy convalescence ensued, and although seven months have passed, no return has taken place. Microscopically, the elements of the new growth were found to be those of the fibroplastic."

In a letter to the *Amer. Jour. of Sci. and Arts*, Mr. Jerome Nickles states that a prize has been decreed by the French Acad. of Science "to Bergeron for his treatise upon *stomatite ulcereuse des soldats*, (soldier's sore mouth.) This is a contagious disease which may be reproduced with some modifications by inoculation; this the author proved upon himself. According to documents collected by him it appears to be demonstrated that the appearance of ulcerated mouth was epidemic in the French army near the end of the eighteenth century. It happened that of all the great armies of Europe, those of Portugal and Belgium together with the French army, were the only ones in which this disease was observed in the form of an epidemic. The crowding of soldiers in the camp, in the barracks, and in the body guard, appears to have been the principal cause of the development and propagation of this affection. Bergeron has introduced the chlorate of potassa in the treatment of this malady. This method shortens the period of the disease, and if employed in the commencement it frequently obviates the necessity of sending the soldier to the hospital."

In an abstract of one of Dr. Beale's discourses on histology, in the *Med. Times and Gaz.*, it is reported that in reference to bone the lecturer "said that whereas dry bone consisted of air-holding spaces, or lacunæ imbedded in a matrix, in recent bone those spaces contained living tissue. With regard to the canaliculi, or fine tubes which proceed from the surface of the lacunæ, two separate hypotheses may be maintained: one is, that they consist of processes, thrown out, or growing out from the 'cells' before ossification; or, perhaps, that they are thrown out after ossification, and then that they bore their way into the bone in the same way as the Pacchionian glands bore their way into the substance of the skull, or as the new Haversian canals are formed in old bone. But Dr. Beale disbelieves this hypothesis, on the ground that the germinal matter is never seen projecting into the canaliculi; in fact, if carmine be accepted as the test of the germinal matter, the latter is always oval, and occupies the lacunæ without projecting into the canaliculi in the least. It is true that cells with stellate projections are found in the periosteum of the jaws, but not in growing bone; in fact, Professor Beale believes that the calcareous matter is deposited in globules, and in the outermost and oldest portion of formed material surrounding each germinal centre; and that the canaliculi are channels, left between the calcareous particles, for the access of convergent currents of nutrient liquid; and that their contour is polygonal, not round, as would be the case if they were projections from the lacunæ. Concerning teeth, the lecturer stated that the dentinal tubes are really prolongations from the central germinal matter of the tooth, and are processes of germinal matter, with calcareous matter between them."

A correspondent of the *Med. Times and Gaz.* asks whether there is any truth in the report, that camphorated chalk tooth-powder renders the teeth brittle.

The *Amer. Med. Times* states that "DR. HEBER SMITH, surgeon of the gunboat Monticello, who was wounded in the face at the affair on the Rappahannock, has returned home on leave of absence. The ball entered the left cheek, and, traversing the teeth of the upper jaw, escaped from the mouth, destroying several teeth, wounding the tongue, and dividing the upper lip slightly. The wounds have all healed except that in the cheek, leaving but slight cicatrices."

In his gleaning from the German journals for the *Amer. Jour. of Pharmacy*, MR. J. M. MAISCH gives the following abstract of a method of purifying silver: "Lazar Berlandt dissolves the silver in nitric acid, evaporates to dryness, redissolves in water, and precipitates by protosulphate of iron. The whitish-gray precipitate is after some hours washed with water, acidulated with muriatic acid, finally with distilled water."

The same collaborator (*Ibid.*) presents the following summary of some observations on the combinations of tin, terchloride of gold, and other metals: "Dr. Witting, sen., found that terchloride of gold in 11·520 parts water rapidly assumes a purple color in contact with pure tin filings. With $\frac{3}{8}$ lead, the tin reacted slower in 6000 water; tin with copper similar in 8000 water, but instantly in the presence of electricity, if the filings were contained in spirally wound copper and silver wire."

The *Amer. Druggists' Cir.* says that the "real *diamond-cement* is prepared in the following manner: Two drachms of powdered gum mastich are dissolved in an ounce and a half of strong alcohol, while at the same time half an ounce of Russian isinglass is dissolved in a mixture of three ounces of water and one ounce of dilute alcohol or brandy. To the solution of isinglass add one drachm of gum ammoniac, previously saturated or dissolved in half an ounce of dilute alcohol or brandy, and then mix with the solution of mastich."

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This is an extremely valuable exponent of the contents for the last decennium, of that standard and popular English medical periodical, the *Lancet*. Besides its intrinsic value, the low price of fifty cents asked for it, should induce every one interested in medicine to secure a copy as a useful addition to the library.

THE
DENTAL COSMOS.
NEW SERIES.

VOL. III. PHILADELPHIA, SEPTEMBER, 1861. No. 2.

ORIGINAL COMMUNICATIONS.

DISCOLORATION OF DENTINE.

BY C. A. KINGSBURY, M.D.

IN the DENTAL COSMOS for June I noticed a brief article upon the above subject.

As it contained an inquiry, seconded by my friend Dr. J. D. White, on an important but hitherto much neglected point in dental practice, I felt inclined to reply to it. I was the more strongly prompted to do so, from the fact that in none of our standard works on dentistry have I, as yet, seen any treatment laid down for such cases.

Tomes, in his Dental Physiology, refers to this subject, and no doubt assigns the true cause in most cases of discolored teeth; also in his Dental Surgery, in treating of necrosis, he notices the discoloration of dentine as a frequent consequence of the loss of vitality in the teeth. He also speaks of the dark stain caused by the application of nitrate of silver, to allay the exalted sensibility of dentine—but in no instance does he give a single direction for removing the discoloration and restoring the dentine in any degree to its normal shade. Indeed, he leads us to infer that, when a tooth becomes stained, either by the coloring matter of the blood permeating its dentinal tubes, or from the action of nitrate of silver or any other therapeutic agent, it is a hopeless case, and must be left to its sad fate. The works of Drs. Harris and Taft also fail to give any explicit treatment for such cases.

For many years I have felt the pre-eminent value of the natural organs over artificial ones. Acting in accordance with this conviction, I have strenuously insisted upon the preservation of teeth by filling, that my patients were disposed to sacrifice. The great objection on the part of the patient in regard to discoloration of the front teeth has been that they would not look as well as artificial teeth. It has been my aim to remove such objections by a proper course of treatment.

The attainment of this object has induced me to make many experiments, in the hope of discovering the best agents and the most successful method of treatment. Although I do not claim to have reached *the "ne plus ultra*" of my wishes in this direction, I am frequently treating cases analogous to that one described in the DENTAL COSMOS, with much satisfaction to my patients as well as to myself.

To illustrate my treatment, I will give a case in point, one of a number treated within the last few weeks:—

Miss P., about twenty-five years of age, desired me to examine her teeth, and perform such operations as their preservation required, calling my special attention to two of her front teeth, the superior central and lateral incisors of the left side. They were very much discolored, and were a source of great mortification. I found them both filled with gold upon their approximal surfaces. There were clear indications that, at the time of their being filled, the decay had nearly or quite reached the pulps. The usual arsenical paste had been applied to destroy the pulps or obtund this sensibility. The teeth were then filled; soon after they assumed a reddish-brown, which changed to a slaty color. The pulps losing their vitality while in a congested state, contained an amount of blood sufficient, when once decomposed and permeating the dentinal tubuli, to cause the discoloration of the crowns of the teeth.

I removed the fillings, and, after excavating free openings into the pulp cavities, they were syringed thoroughly with tepid water. The pulp cavities, as in almost all such cases, were filled with a dark-colored and extremely offensive fluid. I then introduced a suitably sized brooch, having the point armed with a small pledget of cotton saturated with the tincture of iodine. This acts as a most efficient deodorizer; and while its application, repeated two or three times within as many minutes, entirely removes the fetid odor, it also acts as a powerful stimulant and local alterative, correcting any morbid condition existing in the periosteum and surrounding tissues.

My next application was a solution of cyanide of potassium. This not only removes the stain of the iodine, but it acts as a solvent of hæmatine, the coloring material of the blood globules. It also dissolves any remains of albuminous matter contained in that portion of the dentine that has lost its vitality. For some years I used spirits of ammonia for cleansing and bleaching discolored teeth. In many cases it proved an excellent application. It is by no means equal to the solution of cyanide of potassium, for this not only acts as a solvent of hæmatine, but of almost all forms of coloring matter present in discolored teeth; not even excepting nitrate of silver, or the metallic oxides.

When I cannot at once produce the desired change in the color of the tooth, with this application, I have filled the cavity with moistened plaster of Paris, letting it remain from two to five days. I applied the ordinary calcined plaster of Paris in this case with good effect. I finally cleansed and filled the nerve cavities and crowns with gold, and they could scarcely be recognized as the same teeth. I invariably apply creosote to nerve cavities, as well as cavities of decay in teeth that have lost their pulps just previous to introducing the filling. I afterward apply dry cotton or a pellet of spunk, or bibulous paper, to absorb any excess of creosote that may adhere to the parietes of the cavity. I am satisfied that the action of creosote in such cases is not only antiseptic in its nature, resisting the tendency to decay, but it gives translucency and life-like brilliancy to a tooth. In a recent conversation with Dr. W. W. Allport, of Chicago, I found that his experience in this respect corroborated my own.

In using the solution of cyanide of potassium, great care should be exercised to avoid its coming in contact with the gum, especially any abraded or wounded part of it. To prevent it from being forced through the foramina at the apex of the fangs, it is necessary to fill the nerve cavity permanently with gold, or temporarily with cotton saturated with gum sandarach dissolved in alcohol, or some similar preparation, previous to applying the cyanide. Although I have never seen the least unfavorable symptom from its use in my own practice, yet as it is one of the most active irritant poisons, the careless or excessive use of which might be attended with the most serious consequences to the patient, I feel the importance of advising caution on the part of the younger and inexperienced members of the profession, especially when I recall the serious effects produced in many cases, by the unguarded use, in years past, of arsenious acid, and other corrosive and poisonous agents. A reference to any of the standard works on materia medica, describing the properties of this powerful agent, I am sure would be sufficient to deter any one from its improper use.

The solution may be made by adding ten grains of the cyanide to a half fluid drachm of pure water; or, to make it more simple—in the absence of a proper measure—to a piece of the cyanide of the size of an ordinary buck-shot add half a teaspoonful of water.

As it decomposes in a short time, and in a great measure loses its bleaching properties, I am in the habit of preparing it at the time required, and throwing away what remains after using, in each case.

It should be applied upon a small pledget of cotton, not more than one or two drops at a time. In no case should it be left in the tooth, and the patient permitted to leave. After repeated applications, allowing the cotton to remain in the cavity five or ten minutes, warm water should be injected with considerable force from a syringe.

While acids and chloride of soda weaken and destroy the texture of the tooth, this solution possesses superior bleaching power, producing its effect in most cases immediately, without injury to the dentine. Let no one for a moment suppose that the final result can prove satisfactory without the proper use of the excavator, with due care and skill of manipulation in the subsequent operation of filling with gold.

I will only add, that I have found the above treatment to prove highly satisfactory in a large number of cases in my own practice, and I offer it to my professional brethren, hoping that if it should not fully meet their expectations in all cases, they will at least be prompted to such investigations and course of treatment as may lead to more satisfactory results.

PHILADELPHIA, July 27, 1861.

PROFESSIONAL ETHICS.

BY C. P. FITCH.

THIS subject, as applied to dentistry, is one of very extended signification, embracing rules which should unquestionably govern the entire sphere of professional employments. It is used as a caption to this article, suggestive of a few thoughts which I wish to note touching (to some) a very unimportant department of dental duty.

Professional consultation or advice is as frequent as professional interviews; and very often an operator is called upon—if not solicited, the prerogative is oftentimes assumed—to pass judgment upon the work of a professional brother. Many times this is an imperative duty, not at all optional with the examining party. He stands to his patient as a conservator, in a certain sense, of the harder tissues of the oral cavity; and he cannot therefore with impunity withhold his judgment.

But when and how should this duty be performed, dispensing justice to the patients and former dentists? Evidently it should not be postponed to a future sitting, either from a fear of giving offense to predecessors, or from apprehended danger of incurring the charge of cupidity or sordidness either from the patients or parties directly interested. Whether an acquaintance or a stranger, if the advice be sought, a fair exposé of the present condition of the teeth is due.

This duty should be performed without exhibiting any malign *animus*, compromising the operator in remarks, calling in question the quality of the operation at the time of its performance. This is not called for; neither is the act justifiable; and no honorable gentleman will be guilty of such a dereliction of good breeding. A full, plain statement of facts, touching the matter under consideration, should be made, and this at the time the advice is asked. Viewing this subject from a high and honorable stand-point of professional obligation, nothing less could be done, and more than this should not be expected.

The practice of an indiscriminate condemnation of all operations found in the mouths of persons whose great misfortune seems to have been in falling into other dentists' hands, is, to speak in the mildest terms, highly censurable; and the person habitually guilty of this charge should be shunned as the plague or pestilence. We sometimes hear such expressions as the following: "I dread to change dentists, for I expect to have every filling removed that has ever been done in my mouth," or something similar is not by any means uncommon. Evidently the practice alluded to is indulged in to some extent, or such sentiments would never find their way into aphorisms of any community. No doubt many an operator is betrayed into an expression of censure by the adroit remarks and questionings of his patient. But this is quite unfortunate. Whenever this is attempted, it should be met promptly with its appropriate but mild rebuke, defending the claims of dental science, and vindicating, as far as it can consistently be done, the professional character of her former representative. Certainly, if we are not held responsible, prudence would dictate silence. But, what! should never a word be said in the presence of a patient, derogatory to an operator? Most assuredly not. We have to do with the present state of the teeth and their artificial appliances, and not the dentist. We are at liberty of course to think what we please; but reserve should mark our censure touching him, for our conclusions may be entirely groundless, from the following considerations:—

We can never know the disadvantages attending such services. Again, there are many subsequent circumstances over which the dentist could have no control whatever; such, for instance, as cleanliness; local and constitutional diseases, assailing at once the biotic or life-force; a general or specific derangement of the nutritive or eliminative processes, seriously affecting organic or functional action; and frequently, the consequent rapid changes wrought upon the texture of the tooth itself. These, if no other considerations, should ever impose a rigid check against an indulgence the propriety of which, under any circumstances, is very seriously questioned. We are happy to notice and record the fact, that the most intelligent, honorable and high-minded gentlemen of our profession are willing to acknowledge merit wherever and whenever met with. Indeed, to accord the meed of praise, when the evidence of faithfulness and superior operative quality is immediately under one's inspection, will go much further to establish, in the minds of those seeking our counsel, confidence in us, and command from them a recognition of a high order of dental ability and acquirement, than the opposite course; and such acts must ever yield a rich harvest of satisfaction and conscientious delight for having done to our professional brother that which we, under similar circumstances, would like to receive at his hands; especially if deserving, and if not, to let a discretionary silence mark the interview. It is to be most devoutly hoped that the practice of general censure, and the exhuming of supposed decay under stoppings, are fast passing away, and will soon be recognized only as matters of history; and the thought would be quite refreshing that when patients were under the necessity of seeking the professional skill of a stranger, that they could be relieved from the fear of having former operations condemned and destroyed, under the plea of utter worthlesness or great imperfection. At the present time, perhaps the tendency, with the best of operators, is to promise too much in view of the great advances in dental science and practice. These promises are many times based upon honest convictions.

A happy mean lies just here, without foisting upon our patients the thought that we have yet to meet with the first instance of failure in *our* practice, in the treatment of any and every class of teeth under a variety of constitutional temperaments, etc.; we may safely, at the same time, afford them all the hope and comfort which arises from the thorough methods of practice now adopted in operative and mechanical dentistry.

To recapitulate—our position is this: that a manly and full statement of facts should always be made to those seeking professional advice, abating all reflections calling in question the integrity and ability of a predecessor, and that we should never claim too much for our own performances, especially when it may directly or indirectly compromise the character and standing of a professional compeer.

PHILADELPHIA, August, 1861.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL CONVENTION.

REPORTED BY GEO. T. BARKER, D.D.S.

THE Convention was called to order on Tuesday morning, August 6, 1861, at 11 o'clock, in the Music Hall, New Haven, Connecticut.

The President, Dr. T. L. Buckingham, in the Chair.

The minutes of the last session were read by the Recording Secretary, Dr. B. W. Franklin; and after slight amendment, were approved.

A discussion relative to the admission of members ensued.

Dr. Rogers, of Utica, N. Y., suggested the issuing of tickets to members by the Treasurer on payment of their subscription, and that only those holding tickets be admitted on the floor.

Dr. Franklin opposed having tickets, and advocated opening the hall free to all who chose to attend. He wished the public, men, women, and children, would come in and fill the galleries, and so be educated in this most important subject.

Dr. Roberts, of New York, moved that all who wish to become members should sign their names on the roll and pay their subscription, which motion was carried.

The following gentlemen enrolled their names and residences, also paying the required assessment:—

California.—S. Crossett, North San Juan.

Connecticut.—Saml. Mallett, I. Woolworth, H. J. Stevens, A. B. Smith, J. H. Smith, J. T. Metcalf, New Haven; J. B. Snow, D. H. Porter, H. L. Sage, C. Merritt, Bridgeport; L. Parmele, J. S. McManus, E. E. Crofoot, Hartford; A. B. Welton, Milford; A. W. Allen, W. W. Clapp, Norwich; A. Hill, Norwalk; J. A. Pelton, Middletown; T. S. Scranton, Madison.

Maine.—J. M. Nevins, Bucksport.

Massachusetts.—J. Beals, Greenfield; I. J. Wetherbee, Boston; W. W. Rice, Great Barrington; W. L. Bowdoin, Salem; Thos. Palmer, Fitchburg; S. G. Henry, Westboro; H. M. Miller, Westfield; F. Searle, Springfield.

New Jersey.—S. J. W. Neal, Camden; C. S. Stockton, Mount Holly.

New York.—T. H. Burras, D. A. Jarvis, W. B. Roberts, A. McIlroy, C. S. Miles, B. W. Franklin, John Allen, A. Jones, W. H. Allen, G. H. Perine, New York City; Geo. E. Hayes, B. T. Whitney, Buffalo; A. N Priest, L. W. Rogers, Utica; W. B. Heard, W. W. Starr, Brooklyn; S. Mapes, Fishkill; M. Frank, Cortlandt; T. D. Evans, New York Mills; J. C. Smithe, Millerton; H. N. Fenn, Rochester; H. F. Smith, Pine Plains; W. S. Elliott, Sag Harbor; L. W. Sutton, Greenport; A. H. Brockway, Chittenango.

Ohio.—W. H. Atkinson, Chas. Butler, Cleveland.

Pennsylvania.—T. L. Buckingham, S. S. White, J. D. White, Geo. T. Barker, J. L. Asay, A. Merritt Asay, J. R. McCurdy, Philadelphia; James Fleming, Harrisburg.

Vermont.—M. Tefft, West Poultney; J. N. Scranton, Bennington.

The Treasurer, Dr. A. N. Priest, of Utica, N. Y., made his report, which was referred to an Auditing Committee, consisting of Drs. Burras and John Allen, and upon their recommendation was accepted.

Dr. F. Searle, of Springfield, Mass., as one of the Executive Committee, reported that Dr. F. Y. Clark, of Savannah, Ga., having seceded, they had added Dr. B. T. Whitney, of Buffalo, to the Committee.

Dr. Whitney stated that Dr. Clark retained the programme in his possession which had been adopted by the Committee, and not being able to get it, a new one had to be prepared, causing a delay in its issue.

They presented the following report, which was adopted.

ORDER OF BUSINESS.

1. Reading the Minutes of the last Convention.
2. Admission of Members.
3. Report of Officers and Committees.
4. Election of Officers.
5. Retiring President's Address.

6. Induction of Officers elect.

7. Miscellaneous business.

All essays shall be read to open the discussions on the subjects to which they relate.

No member shall speak more than fifteen minutes, nor more than twice on the same subject without permission.

I. ETIQUETTE.

1. Fraternal relations and courtesies among Dentists and with Physicians.

2. Intercourse with patients and the public relating to neighboring practitioners, and their operations.

II. SURGICAL DENTISTRY.

1. Ulceration of the Deciduous Teeth, its effects upon the growth or health of the permanent ones.

2. Inflammatory diseases of the Gums and Periosteum, producing absorption of the sockets and loosening of the Teeth; causes and treatment.

3. Bleaching Teeth when discolored from loss of vitality; means for preventing their discoloration and ulceration.

4. Filling Teeth and Roots. What is gained by fang filling, and average of success?

5. The various plastic materials for filling Teeth. Their relative or individual merits.

6. Hæmorrhage after extracting Teeth. Treatment.

7. Miscellaneous subjects relating to Surgical Dentistry.

III. MECHANICAL DENTISTRY.

1. Surgical preparation of the mouth for Artificial Dentures. Should the roots of decayed and broken Teeth always be removed?

2. When shall we insert Pivot Teeth?

3. The relative merits of the various materials used as a base for artificial dentures, and the method of mounting them.

4. Miscellaneous subjects relating to Mechanical Dentistry.

IV. UNFINISHED AND MISCELLANEOUS BUSINESS.

N. B.—The Executive Committee suggests that half an hour every morning be devoted to the presentation of models, improvements, and inventions, and the disposal of business not embraced in the regular order.

B. T. Whitney,
F. Searle,
Wm. A. Pease,
} *Executive Committee.*

The Convention proceeded to the election of officers for the present year.

Dr. John Allen, of New York City, was unanimously elected President.

On motion of Dr. Rogers, it was voted that in the afternoon session the members' names be called and they take their seats on the side of the Hall at the President's left.

Adjourned until three o'clock.

AFTERNOON SESSION.

The President called the meeting to order at three o'clock, and the balloting for officers was resumed, which resulted in the following selection:—

Vice-President—Dr. J. D. White, of Philadelphia, Pa.
Recording Secretary—Dr. F. Searle, Springfield, Mass.
Corresponding Secretary—Dr. B. T. Whitney, Buffalo, N. Y.
Treasurer—Dr. John T. Metcalf, New Haven, Conn.

The retiring President, Dr. Buckingham, remarked that it was a source of regret to him to state that he had no address prepared to deliver on retiring from the Chair—his excuse was that, owing to the distracted state of the country, for some time there seemed to be an uncertainty whether or not the present meeting would be held, and since it had been so determined it had been out of his power to prepare one. He was glad the two Secretaries had insisted upon this annual session's taking place, and now felt, from the number present, that his own fears were groundless; indeed, the more that he saw of this Convention, the more he was convinced of its value and its progress. The old American Association, where the whole work was done by a few, and the meetings were so controlled, was a failure; but an institution where all is free and open, with appropriate rules for government, he considered a necessity.

Drs. Rogers and Wetherbee were appointed a committee to conduct the President elect to the Chair. Dr. Rogers said, "It is known that 'republics are ungrateful;' but surely this cannot be true of the American Dental Convention, for they have called the man who stands first in mechanical dentistry in the country to preside over them. I introduce to you Dr. John Allen, of New York."

On taking the Chair, Dr. A. expressed his thanks for the honor conferred, and his wish that it had fallen on some one more capable. He said since he was there, all he was or could do should be theirs. He had seen many changes in his life, yet none like the one now agitating the country. Still he could not but congratulate the Association upon the present state of the profession and the number in attendance, even considering the absence of many who usually were with us.

The other officers elect came forward and took their seats.

On motion of Dr. Wetherbee, it was voted that a reporter be employed to furnish the discussions for the daily papers published in New Haven. His object, he stated, was to carry this information outside of the dental journals, and, by giving it publicity, thereby acquaint the people with their designs, and interest them in the subject.

On motion of Dr. Hurd, it was voted that the Executive Committee make a report of the order of business and subjects for discussion previous to the final adjournment.

On motion of Dr. Wetherbee, it was voted that Dr. W. Hooker, of the Medical College, and other medical gentlemen of this city, be invited to seats upon this floor.

The President appointed the following as the Executive Committee: Drs. W. H. Atkinson, Cleveland, Ohio; Geo. T. Barker, Philadelphia, Pa.; W. B. Roberts, New York City; I. J. Wetherbee, Boston, Mass.; Samuel Mallett, New Haven, Conn.

Dr. Franklin moved that the several dental journals be furnished with a copy of the Report of the Executive Committee, with the request that they will give said report an insertion in each number during the ensuing year. Adopted.

Dr. Wetherbee moved the appointment of a committee of three to revise the Constitution. After an amendment by Dr. Buckingham that the committee report before the final adjournment, the motion was carried.

The President called for essays or remarks upon the first subject for discussion, Etiquette, considered—1st, in "Fraternal relations and courtesies among Dentists and with Physicians;" and 2d, in "Intercourse with patients and the public relating to neighboring practitioners and their operations."

Dr. Whitney thought this one of the most important subjects for the consideration of the dentist, and yet it received but little attention even in the dental periodicals of the day. The practical or manipulative department may be found in books, but this could not be so learned. He referred to the difference to-day in the dental profession and what it was twenty years since, when he entered its portals; then each member wore his mantle of secrecy, and what knowledge he possessed was securely locked in his bosom. It was our duty, he thought, to impart all useful information that may tend to the benefit of others. Even as a matter of policy, it is best; for, by a narrow-minded course, we not only lose our own self-respect, but expose ourselves to being considered charlatans and quacks. We also owe much to the medical profession, to whom we have the claim of kindred; and particularly to the medical practitioner do we owe courtesy, and should cultivate with him the most friendly feelings, as there is often a mutual dependence necessary between the two professions.

Dr. Atkinson thought the whole of etiquette was a personal matter, and yet every man of experience knows how sore a point it has always been. Every honest young man who enters the profession, and all are such at their commencement, asks, "What do I owe in respect to my elders?" and justly inquires, "What is etiquette?" Does he always see it in his elders? Do we even know exactly what it is? Does not every individual put his own construction upon it, varying from it according to the influences surrounding him? The golden rule, he considered, was all-sufficient, and is the only sure guide, in all cases; ask yourself the question, when in doubt, would I have others so act to me? The scientific man too often locks what knowledge he has gained in his own breast, and resolves that it shall die with him; but this is not just or right, for we must acknowledge that all we have comes from the great Father for the benefit of the race. Until these general principles are recognized, etiquette is useless. Earnestness also is essential to insure success, and if accompanied with honesty, few would fail. Even an old, hardened sinner can be awakened to his condition if approached with simplicity and honesty.

On motion of Dr. Mallett, Dr. Worthington Hooker was invited to address the convention.

Dr. Hooker referred to the pleasant intercourse which existed between the two professions, and the frequent necessity of meeting each other in consultation; indeed he had that day been engaged with Dr. Mallett in the administration of ether as an anæsthetic. He did not consider the golden rule would in all cases answer in this matter of etiquette, but believed that errors were often made from misconception in both professions. He would instance such a case: A patient may present himself to the physician, suffering from neuralgia. Medical men, as a class, are too apt to ignore the influence which the teeth may exert, and will probably say the disease is due to some other cause. If, subsequently, the dentist is visited, he will probably say that the decayed teeth are the cause. In this expression of opinion the dentist does wrong, for he should first ascertain whether a physician has been consulted, and then advise with him; and the same rule should be observed on the part of the physician. In this way a pleasant and high-toned intercourse will be observed, and the rights of both be maintained. Mere thoughtlessness was too often attributed to a want of courtesy. Much harm was done by men in all professions who profess to know everything, and yet expose nothing but their ignorance. He went to such a one in dental practice some time since, who perfectly flooded him with knowledge, and protesting he could determine the effect of ether upon any person at sight; he would not be understood, however, as being opposed to knowledge, but would have all know as much as possible; but let us not forget that others may be as well informed as ourselves. Dr. H., at the request of the Convention, gave at some length his views upon the proper exhibition of ether, and considered that for dental practice it was not necessary to produce total insensibility, but believed there was a period when partial anæsthesia is induced in which sensation is lost without a loss of consciousness.

Dr. Wetherbee said medical men often felt regret at the expression of opinion by dentists on diseases which did not belong to the dental profession; thus presenting two conflicting judgments to patients, often tending to the disadvantage of both parties. We ought not to be jealous of each other; but a relationship should exist, which should be firmly cemented with a just acknowledgment of the rights of both. He longed for the time when dentistry would be more fully acknowledged as a twin sister of the medical profession. They have claims upon us, and we upon them, which cannot be thrown aside; but we must first make it apparent to the community as well as to other professions, that we are masters of our art. In our judgments of the work of other practitioners, let us be guided by the highest sense of justice and honor. In many cases he considered silence the better part of valor, as there are often circumstances over which the operator can have no control, which may affect the quality of the work; if we thoughtlessly pass condemnation, we also may be condemned by others for the same failings. He thought, however, when teeth came under notice that had been destroyed by amalgam, osteoplastic, or other base materials, we should, without referring to the operator, advise the patient to have them removed, and for the future avoid their use, stating our reasons for such a judgment. Dr. W. alluded to several cases in which he had consulted with physicians; their intercourse terminating with the pleasantest results, and had ever found them ready to impart information to the honest inquirer.

On motion, adjourned to meet on Wednesday morning at half-past nine o'clock.

SECOND DAY—MORNING SESSION.

The minutes of previous day were read and approved.

The following communication was received and read :—

College of Dentists, England, 5 Cavendish
Square, London, July 9, 1861.

To Prof. T. L. Buckingham.

Dear Sir:—The subject of the proposed "World's Dental Convention" has been brought under the notice of the Council of this College, and we are requested to communicate to you, as President of the American Dental Convention for the current year, that in the event of the General Convention being held in London during the Great International Exhibition of 1862, the College of Dentistry will deem it an honor to welcome their professional brethren from America, whose enlightened labors have tended so much to secure for the profession of dental surgery a distinguished scientific position in their own country, and have proved a noble example to the dentists of other countries.

The Council had hoped that the College of Dentists might be made available for the great meetings of the Convention, but inasmuch as the profession in England is so divided, it appears desirable that *neutral ground* should be chosen for this purpose, thus both sections of English dentists might unite to welcome their brethren from distant lands.

We have the honor to remain, dear sir, with much respect, your faithful servants.

(Signed) George Waite, M.R.E.S., *Pres.*
Samuel Lee Rymer, } *Hon. Secretaries.*
Anthony Hockley, }

On motion of Dr. Franklin, it was accepted and ordered to be incorporated in the minutes of the meeting.

On motion, a committee was appointed, consisting of Drs. Buckingham, Wetherbee, and McIlroy, to take into consideration the letter, advise any action they may think expedient, and report at to-morrow's session.

The discussion on "Professional Etiquette" was resumed.

Dr. Hurd, of Brooklyn, fully approved of what had been said yesterday, and believed all had no doubt been profited, but considered we had but crossed the threshold, as the subject was both extensive and far reaching, even beyond the precincts of our profession and that of the physician. It required us often to descend from our lofty eminences and consult with those we may consider our inferiors; but who of us has not imperfections? and even a bungler should receive consideration if he is honestly striving to elevate himself—then it is he is entitled to the respect of every member of the profession. True etiquette goes even further, and requires silence upon others' faults; even when justice would seem to demand exposure, it prevents those significant winks and nods, which often convey so much, and all public criticism upon a brother's *writing or spelling.* Selfishness and envy must be thrown aside before we can hope to attain perfection. I had rather, said he, bless my own soul by a good act toward an enemy than do him injustice by an ill-natured remark. (Dr. H.'s remarks were delivered in a most eloquent manner, and were, as they deserved to be, warmly applauded.—Rep.)

Dr. Searle referred to the time, which was not far distant, when medical men looked upon dentists as mere mechanical operators, and therefore denied them their confidence and respect. But now, those men are passing from the field of action and a younger and more liberal class are taking their positions; upon these we can exert an influence for good which will result in a mutual benefit. Particularly upon the diseases of the teeth can we give them instruction, and he had always found that it had been kindly and generously received. He would, however, have dentists know and assert their rights, and where this was done, it would be both beneficial to patients and medical practitioners.

The President, Dr. Allen, requested Dr. White to take the Chair, and proceeded to read a paper upon

"CAUSES WHICH RETARD DENTAL PROGRESS."

"For more than two thousand years dentistry has been gradually advancing, though slowly, yet more and more rapidly as its progress with the march of time has been onward. There may be those who will note the present era as the time when dental surgery reached its ultimatum. So thought many of our predecessors in years gone by; but the future historian will doubtless look back upon the year eighteen hundred and sixty-one as forming only a connecting link between the past and the future, and that a still brighter period in our profession will mark the page of history. The rapid advancement of dental science within the last thirty years is only an index of what is to come. The facilities now afforded for acquiring a thorough dental education through the instrumentality of numerous well-qualified private preceptors, together with the dental colleges, dental associations and dental literature, in this country and in Europe, all point with peculiar significance to a brighter future. The march of improvement is still onward; the sun of science continues to shed its genial rays upon our profession, and to develop more perfectly the principles upon which it is based. But still, with all these advantages, and all that has been done to bring dental surgery forward to its present stand-point, much remains yet to be accomplished.

"We deem it proper, therefore, to notice some of the causes which retard our onward progress. There are many who never venture out of the old beaten track of their predecessors; they will acquire, perhaps, the same degree of skill, go as far as others have gone, but no farther. They, however, nobly sustain the profession as they find it, and their valuable services have done much to ameliorate the condition of those who were so fortunate as to fall into their hands, and many of their operations will stand as truthful records of their memory, long after they shall have gone to their last home.

"If these worthies would venture onward to some unbeaten track, their sphere of usefulness might still be enlarged, for in their reconnoitering they might, perchance, discover some new principle or improved method of accomplishing what is already known, and thus add to the common stock of dental science; but they decline doing this, and rest upon the laurels already won by others.

"Another cause that prevents advancement rests with those who venture on a little way, and then turn back before their point is gained, having reached only the conclusion, that if it were possible to accomplish the object had in view, it would long since have been done by some one else. Suppose Harvey had reasoned thus when he commenced his investigations with reference to the circulation of the blood. If he had, the world might yet have been in darkness upon the subject.

"Suppose Columbus, after having made a voyage or two in pursuance of his favorite theory, had failed to discover this continent, (which to others then seemed to exist only in his brain,) and had abandoned his object as hopeless, he would not then have been the means of shaping the destiny of millions of our race, who are now enjoying the benefits of his conceptions, his energy, and perseverance.

"If Fulton had listened to the advice of friends, whose minds were not enlightened like his upon the subject of steam-power, he never would have developed that great principle which has revolutionized the commerce of the world. But he saw in his mind's eye the engine working, the steamboat moving, the benefits germinating, which would redound to his honor and to the prosperity of nations yet unborn. That which he saw only within the small compass of his brain, we can now see in the forms of steam ships, steam cars, steam mills, steam factories of such gigantic proportions as to fill the mind with awe, wonder, and surprise.

"We might dwell with interest upon the thousands of inventions and improvements that mark the progress of science and civilization, all of which first originated in thought, then dwelt in the secret chambers of the human brain, where they were modeled and perhaps already working in the spirit of man, long before they were clothed with a body, and developed in practical forms.

"These examples show us the great importance of vigilance and perseverance also in our profession. Again, it is thought by many that our profession is not sufficiently remunerative to justify much expenditure of time and money, in the preparation and pursuit of dental practice. This feeling begets apathy, which retards our progress. Apathy should not find a lodgment among us, for two reasons: one, because our own prosperity requires constant vigilance; the other, because the community in which we live claim our best services. But, says one, I have to compete with very incompetent men, who charge but half price for their services, and I must meet them on their own ground. Not so: this is the wrong ground to occupy; it is far better to avoid those low competitors, by keeping off their platform. Seek a higher level; the most effectual means of putting down empiricism is to soar above it, and help others up rather than lower yourself. This position will command a practice both lucrative and honorable, for the public are not so dull of perception as to be unable to discriminate between the true professional man and the one devoid of the essential requisites that characterize a well-qualified practitioner, who calls to his aid all those fundamental principles and collateral branches which eminently qualify him for the discharge of his professional duties. To this end, he seeks the aid of physiology, which teaches him the functions of the different parts of the human system; of anatomy, which unfolds to him the situation, structure, and economy of the animal body; of pathology, which explains to him the nature of diseases, their causes and symptoms; of therapeutics, which guide him to those curative agents that assist nature in restoring health when attacked by disease. These, together with chemistry, mineralogy, metallurgy, and other minor auxiliaries which are acquired by experience in manipulations, illuminate the mind thus disciplined, and its genial rays reflected upon other minds, dispel the darkness which the empiric leaves in his train; and thus the public can readily distinguish between the man of science and the mere pretender, and will bestow patronage accordingly.

"There is another class of dentists who do but little toward furthering our course, although they are good practitioners, profess strong powers of perception, can see defects still in the dental art that ought to be overcome, but are unwilling to incur the necessary expense and time that may be required to produce the desired results. They are unwilling to prosecute investigations in the dark labyrinth that lies before them, without the hope of reward. We trust the time is not far distant when acceptable provisions will be made by means of which this obstruction will be removed, and all others that tend to impede our progress. Let every one feel that he can do something, that there is yet room for him to make his mark, and then much will be accomplished. Bear in mind, that men's acts live after they shall have passed away; and may some lasting good result from the part we have taken in this life."

The subject of "Professional Etiquette" was resumed.

Dr. Jarvis considered the subject of fundamental importance, and would be glad if we could lay down some rule by which our actions might be governed in all cases. The golden rule is one of great beauty, but thought there were circumstances in which it would not apply. It might be thought preposterous to think of superseding it, but would prefer to adopt the following: First. Kindness, uniform and never to be forgotten.

Second. Justice though the heavens fall. He would instance a case where the golden rule should be laid aside for these. A person consults a physician as to the cause of pain in a tooth which has been previously filled; he expresses his opinion by stating that the pain is due to the filling; if, when the dentist sees the case, finding the filling perfect, that the pain is the result of a bruise, he would ask, if we should apply the golden rule, would say no! If there be blame, and justice to others requires us to show it, he would never hesitate to do so, accompanying it with all kindness, but yet with justice as a requirement of the profession.

Dr. Stockton passed a high eulogium upon the kindness he had received from the elder members of the dental profession.

On motion, the next subject for discussion was taken up, being "Ulceration of the Deciduous Teeth, its effects upon the growth or health of the permanent ones."

Dr. J. D. White remarked that he supposed the question referred to the effect of ulcerated roots, and would answer, that he should not always consider them injurious. It is true that by the early loss of the temporary an indirect influence may be exerted upon the permanent teeth. He considered the judgment of the operator could be the only guide for the treatment, as if the ulceration is extensive it may do injury to the permanent, but if not so, thought no harm would result. The presence of the deciduous teeth are of the greatest necessity for the perfect development of the permanent set, and never extracts such teeth, except upon the direst necessity. It is the great fault of operators to yield too readily to the importunities of parents in removing such teeth—indeed it seemed to be an almost American trait to be anxious to get rid of the temporary teeth; as a consequence we meet constantly with contracted maxillary arches, particularly of the superior jaw, the result of this meddling. He had been censured for this course, but believed it to be the true one, as the disease to these teeth will often pass off, leaving them to perform their natural functions in the animal economy. The old practice, viz., that of the removal of all diseased teeth, both permanent and deciduous, he had seen the folly of; indeed had often cut off the ulcerated roots of deciduous teeth, where they had been pressed from their sockets, causing irritation to the cheek, being held in by a small portion of gum, embracing the neck of the tooth; and remarked that all were doubtless aware the process of absorption of the fangs was arrested when they were thus ulcerated.

Dr. Atkinson agreed with Dr. White, that we often distort the faces of the dear children by our haste to interfere where "an angel would not dare to tread." We should have a higher conception of molecular action, and should study more closely the influences governing absorption of the fangs of the temporary teeth. He knew that we extract too many deciduous teeth, while with our own children we search out the cavities of decay and fill them. If we allow these teeth to disintegrate and be lost before the permanent ones are ready to take their place, there will be a lack of development, for the necessary molecules cannot be deposited unless there is the requisite amount of circulation. He described ulceration to be merely the effort of nature to remove the broken-down and disintegrated tissue about the apex of the fang, and thought Dr. White's method of amputating such fangs, when possible, as correct practice.

Dr. Butler considered amputation of roots quite as practicable as that of a finger. It would be well to examine and see to what ulceration is due; it is usually the result of the death of the pulp, and this we should prevent, when possible, by filling deciduous teeth. He had, on several occasions, cut off the palatine fang of permanent molar teeth, and such have been retained and performed good service.

Dr. Wetherbee referred to parents bringing their children, with the desire that certain teeth should be extracted; he would advise them against such action; they would frequently go away, but again return, begging him to operate; in such cases he would peremptorily refuse, considering it the worst of malpractice. We should not fail to explain to the parent, and enlighten them as to our reasons. He usually recommends, for the removal of the fetid condition of such teeth, a daily syringing, sometimes with creosote, more frequently with paregoric; has also treated such teeth and filled them successfully.

Dr. Priest spoke of the necessity of filling the deciduous teeth, and thought it our duty to educate parents as to its importance.

Dr. Woolworth agreed with Dr. Priest, and had noticed where the deciduous teeth were extracted early, the permanent ones would also come through too soon.

Dr. Buckingham said that ulceration was only one of the effects of inflammation, but considered that the influence exerted would depend very much upon the general health of the child; in a perfectly healthy one, no bad results would follow, but with the reverse, such systemic disturbances may be exerted, that it would be necessary to extract the tooth; therefore, the judgment of the operator could be the only guide. The circulation and nutrition of the permanent and that of the deciduous teeth were so independent that he considered (except in rare cases) no local influence could be exerted upon the former by the ulceration of the temporary teeth.

Dr. Atkinson drew a diagram, and gave a lengthy and interesting description of the formation of an alveolar abscess; he would, under some circumstances, extract ulcerated deciduous teeth, when occurring at an early stage, when the permanent ones were in a soluble condition; considered such cases rare. In one case could recall, where ptyalism was induced in a child until sloughing of the process containing the deciduous teeth took place, and yet the person eventually had a good set of teeth. Dr. A. was asked and answered several questions on this subject.

Dr. White, in reply to a question, as under what circumstances he would extract deciduous teeth, said that individual cases prove nothing, but we must form our judgment from the great aggregate of practice. No surgeon, let the description of the case be ever so minute, would venture upon a prognosis without seeing the patient; and this answer he would make to the question: he must see the patient, or he could tell nothing. It was impossible to put on paper just what you would do in all cases; could only say, would extract the diseased deciduous ones, when he felt they were damaging the permanent set; would refer to the importance of taking notes of everything that occurred in practice; particularly should this be observed by young practitioners. Many things were to be taken into consideration before determining to extract, and where the general health seemed to be suffering, we should call in consultation a medical adviser.

Dr. Roberts would ask Dr. White, what proportion of teeth he extracts for children where he fears the permanent ones will be affected?

Dr. White seldom extracts for the effect upon the permanent set, but usually from the influence exerted upon the general health. Has seen much injury done by early extraction, but had charity to think the children might have been suffering from constitutional disturbances; but thought, if the permanent tooth is laid bare by early extraction, when the enamel is not dense and will absorb the fluids of the mouth, injury must follow.

The discussion, which was of an interesting character, though confined much to questions and answers, was continued at some length, being participated in by Drs. Franklin, Whitney, Palmer, and others. Drs. Wetherbee, Whitney, and Rogers were appointed a committee to revise the Constitution.

Communications were received from Dr. Charles Hooker, inviting the Convention to visit the medical institution of Yale College; also from Mr. Herrick, extending an invitation to the members to visit the Trumbull Gallery, Museum, and the various college buildings.

On motion, the thanks of the Convention were tendered to these gentlemen, and the Secretary was instructed to communicate the same.

Adjourned to meet at three o'clock.

SECOND DAY—AFTERNOON SESSION.

The President called the Convention to order at three o'clock.

On motion, the second subject in "Surgical Dentistry" was passed over, and the third—"Bleaching Teeth, when discolored from loss of vitality; means for preventing their discoloration and ulceration"—was taken up for discussion.

Dr. J. D. White considered the term "dead tooth" an erroneous one, as even when the pulp dies, the periosteum still performs its limited function of nutrition; but this error of language was due to the fact of the deficiency of a good dental nomenclature. The discoloration seen in teeth, after the death of the pulp, is usually attributed to the breaking up of the red corpuscles of the blood, the hæmatine or coloring principle of the same permeating and becoming lodged in the tubular structure of the dentine. This he considered was not the cause, but thought it due to an absorption of the fluids of the mouth. Again, teeth will not discolor after they have been removed from the mouth. A blow or other injury will discolor a tooth; and, indeed, had seen teeth with live pulps that presented the red appearance. Why this was so he could not tell. A tooth may also become discolored by an inflammation of the pulp before its death. As to the bleaching of teeth, each one had his favorite method: he would only refer to one which had been spoken of in one of the recent dental journals, viz., Labarraque's solution; this he thought very deleterious, as a tooth immersed in it for twenty-four hours, though turned white, has its normal structure completely destroyed, and would rapidly discolor in the mouth.

Dr. Barker regretted that he could not agree in all Dr. W. had said, that the coloration was not due to the permeation of the disintegrated red corpuscles; because teeth are not discolored out of the mouth after removal. In a healthy tooth, with a living pulp, the tubuli of the dentine are filled with the liquor sanguinis of the blood, which conveys to those tissues the materials necessary for their proper nutrition; this circulation is due to the ever-present action of exosmose and endosmose, and these continue after the death and disintegration of the pulp; and the broken-down, red corpuscles, which previously were too large to pass into the open-mouthed dental tubuli, may now by endosmodic action enter, thus inducing discoloration; but after removal from the mouth, this action would cease. In bleaching, the first duty should be to bring the tooth to as healthy a condition as possible, before attempting to restore the color. That teeth may be nearly restored to a natural color he did not doubt, as the experiment had been tried on one of his own teeth, which had been discolored for four years, accompanied with a slight chronic periodontitis; his friend, after removing the gold filling in the pulp cavity, treated the tooth and restored it to a good color by using a preparation of prepared chalk and chloride of lime, introducing it each day.

Dr. Atkinson said that the subject of bleaching required a vast deal of knowledge of the laws of chemical equivalency. Color is not an entity, but an arrested fractional part of light. To bleach a tooth, the whole decayed mass, hard or soft, must be removed. Chlorine is the great bleaching agent, and when used, it must be so combined as to produce its least deleterious effects. For this purpose he used the *undeliquesced* chloride of zinc, crowded into the cavity of the tooth.

Dr. Barker asked Dr. A. if chloride of zinc was a bleaching agent, or had such properties.

Dr. Atkinson replied that he was misunderstood; that he expressly stated that chlorine was the bleaching agent; and that the chloride of zinc, when introduced into the tooth, *undeliquesced*, absorbed water from the mouth, becoming liquid, and thereby the chlorine was liberated to effect its bleaching.

On motion, Prof. G. F. Barker was requested to give his views on the chemistry of the subject of bleaching. He stated that while it is true that chlorine is the great bleacher, it is quite doubtful whether this action is due to the chlorine itself, since it will not bleach except in presence of moisture. In this case, where water is present, the chlorine unites with the hydrogen, setting free the oxygen, which in a nascent state—as ozone, perhaps—effects the bleaching. Moreover, the active agent in both the chlorides of lime and soda (the last Labarraque's solution) is not chlorine, as such, but hypochlorous acid, which acid is set free from combination by any other acid, even the carbonic from the atmosphere. In the chloride of zinc—which is a *binary* compound, while the others named are *ternary*—no such action can take place. And he contended that the simple deliquescence of this salt—its passage from a solid to a liquid state—could not, in the nature of things, decompose the salt and set free the chlorine for bleaching. "This is not my opinion," he concluded, "but the fact. I have no *opinion* on the subject."

Dr. Butler asked to what the influence of chloride of zinc was owing, as he had noticed its beneficial effects in whitening teeth.

Prof. Barker replied that whatever virtue there was in this substance to whiten, was due rather to the salt as a whole, than to either of its constituents. His impression was that it acted physically in presenting a white ground in the tooth, and perhaps assisted to soften and remove animal coloring matters.

Dr. Hayes said that after trying all the so-called "bleachers," he had returned to the old practice of scraping the decayed and discolored bone from the pulp cavity and canal as much as possible, and then filling solidly with gold, and obtained good results.

Dr. Wetherbee had for ten years discarded bleaching agents in the treatment of discolored teeth. He first removed all foreign matter in the pulp chamber, and then thoroughly scrapes the inside of the fang, cutting away all dead bone, then fills the tooth solidly with gold. Teeth well filled will often return to a nearly natural color.

A discussion took place between Drs. Wetherbee and Atkinson as to the anatomical structure of the tooth, and the existence of cementum in its interior. Dr. A. contended there was no internal cementum, but only an exterior, covering the fang above the neck of the tooth; while Dr. Wetherbee cited Fox and Hunter to prove that it was also found internally, acting as a cushion to the dental pulp.

Dr. J. D. White stated that from drawings made from actual specimens when he was microscopist to the old American Dental Society, the structure of a central incisor was bivalvular, resembling a clam; there being two thin plates of enamel lined with dentine, having a membrane on its interior surface, and a large cavity filled with pulp. There is a crack along the cutting edge of every tooth. To prove that this was not accidental, he examined teeth before their protrusion through the gum and found it true of these.

The tooth from which the microscopical specimen was taken was from a dead subject; it being one that had never passed through the gum.

Dr. Barker said he would like to refer to the subject of internal cementum, which had called forth remarks from Drs. Wetherbee and Atkinson. He would commence by drawing a diagram of a tooth, showing the three different tissues, as described by the best physiologists and microscopists of the day, and would ask why dentine or enamel could not be denominated cementum? and would answer by stating that, first, each one of these differed in the quantity of organic and inorganic material; second, they each were differently constructed anatomically and physiologically, also presenting quite opposite appearances under the field of the microscope. Cementum has been justly denominated tooth-bone, as it nearly approaches in structure true osseous tissue. If a section of bone be examined with the microscope, we see what are denominated Haversian canals, with branching canaliculi and lacunæ—their use being to convey nutrition to the part which is always extra-vascular—and if a section of cementum be used, we shall see but a modification of this structure, and would ask if any one had ever seen such an appearance from an internal section of a tooth, and doubted if such could ever be obtained. Secondary or osteo dentine under the microscope will present none of these characteristics.

Dr. Wetherbee said, he would refer Dr. Barker to the works of Drs. Fox and Hunter to prove the existence of internal cementum.

Dr. Barker replied that he would refer Dr. W. to the works of John Tomes, who commenced his investigations where the others ended.

Dr. White stated that the best practice to whiten the teeth was to open and thoroughly clean them, keeping them dry and open to the air and light. This would be better than bleaching, as he had known injury to result from the use of chemicals.

Dr. Palmer had abandoned bleaching agents, but cleaned out the tooth well, and if very much discolored, took out all tissue that was disintegrated, then put in some white lint or flax and filled it solidly with gold, and thus gets a good color.

The Committee on Constitution made a report, through their chairman, which was adopted, and the committee thanked for their promptness.

We quote only the following from the Constitution:—

"Art. 8. Any dentist may become a member of this Convention on the conditions herein mentioned, unless objection is made, in which case he may be excluded by a vote of the Convention.

"Art. 9. Honorary members may be admitted by a special vote of the Convention."

Adjourned to meet on Thursday at 9 A.M.

THIRD DAY—MORNING SESSION.

The Convention assembled and considered various dental inventions for an hour.

Dr. Franklin presented to notice a new style of vulcanite teeth, invented and manufactured by Mr. S. S. White, of Philadelphia. The peculiarity consists in having a protuberance moulded upon the block to assist the pins in retaining the teeth in position in the rubber base. He also exhibited an improved vulcanizer, with a fusible metal gauge of his own invention.

Drs. Hayes and Whitney also presented their own improvements in vulcanizers.

The committee to whom was referred the London communication made a report, which, after considerable discussion, was recommitted—Drs. Hayes, Rogers, and Franklin being added to the committee.

On motion, the Convention went into ballot to select the next place of meeting. After a long time spent in deliberation, Trenton Falls, New York, was determined upon, the Convention to assemble there on the second Tuesday in August, 1862.

The Executive Committee reported the following as the order of business for the next meeting:—

1st. Admission of Members.
2d. Reading Minutes of the last Convention.
3d. Report of Officers and Committees.
4th. Election of Officers.
5th. Retiring President's Address.
6th. Induction of Officers.

All essays shall be read to open the discussion on the subjects to which they relate.

No member shall speak more than ten minutes, nor more than twice on the same subject without permission.

I. MISCELLANEOUS SUBJECTS.

1. Anæsthetics. Their use and relative value.
2. Alveolar abscess.
3. The causes influencing an abnormal development of the teeth.

II. OPERATIVE DENTISTRY.

1. Filling Teeth. Simple and complicated cavities.
2. The Dental Pulp. Its varied treatment.
3. The Extraction of Teeth.

III. MECHANICAL DENTISTRY.

1. Artificial Dentures, temporary and permanent.

IV. UNFINISHED BUSINESS.

N.B.—The Executive Committee suggest that half an hour every morning be devoted to the presentation of models, improvements, and inventions, and the disposal of business not embodied in the regular order.

On motion, Dr. Atkinson was requested to read his essays, which he proceeded to do—the first one being entitled "What lack I yet?" second, "Life." Both of these papers will appear in the October number of the DENTAL COSMOS.

Adjourned to meet at three o'clock.

THIRD DAY—AFTERNOON SESSION.

The President called the Convention to order at three o'clock.

An invitation was received from Professor B. Silliman, Jr., for the gentlemen of the Convention to visit the buildings and laboratory of the Sheffield Scientific School. Accepted, and the thanks of the Convention returned.

Dr. Perine moved that before the meeting adjourned, a certain time be allotted to discuss the propriety of appointing dentists in the army and navy.

The next subject in order—"Filling Teeth and Roots; what is gained by fang filling, and average of success"—was then taken up for discussion.

Dr. Asay described the method employed by him, differing not materially from the usual one.

On motion, the time for each speaker was reduced to ten minutes.

Dr. J. D. White, in answer to the question as to what is gained by fang filling, said that we gain a great deal, in so far as metal well packed will shut out the gases and fluids which decompose and injure the structure of the teeth, also closing a cavity that may become filled with pus. The assertion that the pulp cavity is empty after the destruction and removal of the pulp is erroneous; this can be proven by the use of a silver probe, which will always be blackened. Again we see the frequent discoloration of the whole body of the tooth. Softening of the tooth structures takes place in all cases after the removal of the pulp, but this is much greater when the fangs are left unfilled. Does not fill immediately after the pulp has been extirpated, but waits until anastomosis takes place between the divided blood-vessels of the pulp and those of the periosteum, then plugs up the root and crown tightly. Regarded it best so to fill fangs that it may be removed in case of trouble, allowing the proper treatment to be extended. Dr. W. also gave his method of treatment of alveolar abscess.

Dr. Barker said that, in considering this subject, he would take, for an example, a tooth where the pulp had been destroyed and removed, and would ask, what would be the nature of the inflammation that would ensue at the apex of the fang, and might not the higher grades be induced, which could not be properly treated if the tooth was immediately filled? His custom was to fill with cotton, leaving it for one week after the extirpation of the pulp.

Dr. Wetherbee thought fang filling the most important work, as it was the best evidence of the ability of the dentist. He would take issue with the last speaker, as to the propriety of not filling immediately. His own practice was to remove the pulp, and having secured the cessation of bleeding by applying creosote, fills at once, and would not be hired to delay it for a single day. Success had taught him that his method was correct, for in no case, during the past ten years, had he seen a single unfavorable case, but had seen bad results where the tooth had been left after the removal of the pulp. Referred to several interesting cases in his own practice showing the advantage of immediate filling.

Dr. Perine considered that to obtain success we must adopt an eclectic practice. Every one, no matter what his capabilities may be, must, in a certain number of cases, meet with failures. He referred to a case where he treated two teeth, which, after a short time, proved unsuccessful; he removed the fillings, treated the teeth and then filled, but with the same result. Our register may state success after success, but we have no means of knowing how many unfavorable cases fall into the hands of other practitioners; they lost far more than they were aware of, even where the teeth were well filled.

Dr. Roberts believed when a tooth is diseased, the result of the death of the pulp, it will always remain so, and though it may remain for a long time in the mouth, there will always be more or less soreness felt in it, not enough, perhaps, to annoy the patient, but yet an unnatural feeling. After destroying and removing the pulp, when we fill the fangs, it should be done solidly to the apex; but in the vast majority of cases, we fail to do this, even where we honestly think we do it; particularly is this so in the molar teeth. The manner of filling in many cases must be varied, as certain circumstances and conditions of the patient must be taken into consideration. We may hammer and work at some teeth as much as we like without causing the least disturbance, but in others the most gentle treatment will produce unpleasant results. He did not believe every tooth could be saved, and thought the best operators may fail, from circumstances beyond their control.

Dr. Tefft related a case of fang filling in his own practice; he would ask Dr. White if those having vitiated constitutions were not the hardest patients to treat. Dr. W. replied that he was always governed by the diathesis and temperament of his patient, and had some for whom he extracts teeth immediately on the exposure of the pulp.

Dr. Metcalf referred to an interesting case that terminated in ulceration of a malignant type; he extracted the tooth with the socket attached. He attempted also to treat an exposed pulp in another tooth, but the same result supervening, he of course failed. The patient was of a scrofulous diathesis.

Dr. Franklin said, the failures which are reported are not unfrequently the result of a misunderstanding of the case by the operator; in his opinion, if a definite line of practice was pursued, we could obtain more nearly constant results.

Dr. Atkinson gave, at considerable length, his views as to the change which takes place at the apex of the fang after the pulp has been extirpated, illustrating them by means of a diagram. He thought there was a misapprehension in the minds of many, and that we often go farther than we should, thinking we know more than we do. Thought, if there was no inflammation about the fang, it could be filled immediately—first extirpate the pulp, cleaning out well the pulp cavity, and then proceed to fill. If alveolar abscess is induced, don't take out the filling, if it is a good one, but treat it from the outside, by drilling through the process.

Dr. Searle said, we often had to be governed by the circumstances of the patient, as many of his own came from the country, and he could not see them frequently. In cases where he opens into a tooth with a dead pulp, he dares not fill immediately, particularly if he cannot control the case; therefore puts in a test filling, and tells the patient in case of trouble to visit the nearest intelligent practitioner, and let him see the case. He never dares to fill a tooth so that he cannot remove the fang filling in case of inflammation; also prefers to open into the pulp chamber from the palatine surface of front teeth, in preference to opening through the cavity of decay.

Dr. White explained his manner of rolling a piece of gold, so as to be easily introduced and removed from the fangs of teeth.

Dr. Burras read the following paper on

"MASTICATION AND ARTICULATION OF ARTIFICIAL DENTURES.

"To distinctly understand the subject of mastication, and clearly comprehend the aim and object for which artificial dentures are constructed, it will be necessary to have some knowledge of the parts, particularly of the composition of the tempero-maxillary joint, that is, of the ligaments by which its motions are restrained, and the muscles by which those motions are effected or produced.

"The inferior maxillary bone is articulated by its condyles on each side with the glenoid cavity of the temporal bone. This glenoid cavity is bounded anteriorly and superiorly by a prominence called the articulating eminence, and is of some considerable consequence and influence in controlling the motions of the jaw in mastication. From the relative position in which parts composing these joints are disposed, and the intimate connection of the inter-articular cartilage and the condyles, this articulation is very peculiar, somewhat nearly resembling that of the elbow-joint in its motions. There are three ligaments appertaining to this joint. The external lateral, by its superior extremity has a broad attachment to the articular eminence and outer ridge of the glenoid cavity. It extends obliquely backward, and is inserted upon the outer side of the cervix of the lower jaw. The internal lateral is attached by its superior extremity to the inner edge of the glenoid cavity, passing in an oblique direction downward and forward, and is inserted at its inferior extremity to that little bony projection, on the lower jaw, surrounding the posterior maxillary foramen, where the dental vessels and nerves are protected by it from the motions of the internal pterygoid muscle. The stylo-maxillary or suspensory ligament arises from, and is attached to, the styloid process of the temporal bone, and is inserted at the angle of the lower jaw. Its use is to restrain the forward motions of the lower jaw, upon the articular eminence of the temporal bone.

"The motions of the lower jaw are controlled by the muscles, and are somewhat free and extended. The simple ordinary motions are depression, elevation, protension, and retraction, and I may add, lateral or partial rotation. When the lower jaw is depressed, the condyles are advanced upon the articular eminences, and the angles of the jaw are carried backward; consequently the centre of motion is below the condyles, allowing the jaw to be depressed to a greater extent than if the motion of the condyles was restricted to the glenoid cavity.

"The only muscle that acts as a depressor of the jaw is the diagastricus. The origin, insertion, direction, and pulley-like attachments, are beautifully adapted for the performance of this office. It arises from the root of the mastoid process and os hyoides, and is inserted into the lower and anterior portions of the chin. Its use is to draw the jaw downward, and assist in deglutition.

"The elevation of the jaw is performed by four pairs of muscles, the combined power of which is more than most persons would suppose possible, having seen a statement of force exercised by them of 450 lbs. pressure. They are the temporales, masseters, pterygoid, internal and external.

"The temporales has its origin from the os frontis, portion of the os temporis, back part of the os malæ, and the temporal portion of the os sphenoides. It is inserted into the coronoid process of the lower jaw. Its use is to move the lower jaw upward.

"The masseters have their origin from the malar process of the os maxillare, the lower edge of the os malæ, and the zygomatic process of the os temporales. They are inserted into the base of the coronoid and the condyloid processes. They serve to raise and move the jaw backward and forward.

"The pterygoid internus arises from the inner surface of the outer wing of the pterygoid process of the sphenoid bone, and from the process of the os palatæ, that helps to form the pterygoid fossa. It is inserted into the inner side of the lower jaw, near its angle. Its object is to raise the jaw and rotate it to one side. The pterygoid externus arises from the external alæ of the pterygoid process, part of the adjacent maxillary process, and ridge of the temporal process of the os sphenoides. It is inserted at the fore part of the condyloid process, and likewise into the capsular ligament of the lower jaw. Its use is to move the jaw forward and to the opposite side, that is, when the muscle acts singly. When both act in conjunction, the jaw is brought horizontally forward. Its insertion prevents the ligaments of the jaw from being interposed in the peculiarity of its motions.

"The process of mastication is performed by the operation of those muscles, the uses of which have just been described, and consists of two distinct actions: biting, or the separation of particles by means of the incisor teeth; and chewing, or the process of grinding by the molares. By a repeated continuance of this action the food is ground, comminuted and reduced to a pulp, and is thereby prepared for the act of deglutition or swallowing.

"In observing this process, and examining the motion of the lower jaw of children before the teeth are disrobed, there will be considerable deficiency observed in the articulating process of mastication, in not having that free and extended motion which is permitted in the adult. The glenoid cavity being circumscribed to very little more than the size of the condyles, and the articular eminence not being yet formed, consequently the motion of the jaw of infants is confined to simple elevation and depression, with scarcely the least approach to rotation, the condyle being the centre of motion in this instance. A sequence almost parallel with this is produced in aged persons who have lost all their teeth, although the state of the mouth, and the circumstances producing this peculiarity are widely different. After the complete removal of all the teeth, and the absorption of the alveolar process has progressed to any great extent, the face will become considerably shortened, in some cases by nearly if not quite the length of the upper and lower teeth, that is, when the mouth is closed to the occlusion of the lower to the upper jaw. When the lower jaw is retained in the position it occupied before the teeth were extracted, the opening between the jaws is sufficient for the introduction of food and most other purposes, and it is seldom necessary to open sufficiently wide to bring the condyles forward on the articular eminences. The operation of mastication in an aged person of this description is very similar to that of an infant, and confined chiefly to the depression and elevation, and not having that alternate lateral motion. When the lower jaw of a person in this condition is closed, the chin describes a large circle and is thrown very much forward, projecting far beyond the upper jaw, so that what little mastication is performed is effected by the sides of the jaws, the only parts that can be brought in contact. In procuring a correct articulation for artificial teeth the profession has been very much perplexed, and many artificial dentures, otherwise comparatively perfect, have been rendered useless by this operation having been negligently or imperfectly performed. And as there have been, heretofore, no established usage or particular directions adopted by the profession in obtaining correct articulations, I desire to give a mode of practice I have pursued for some years with great satisfaction to myself, and the various members of the profession to whom I have communicated it have given it their *unqualified* approbation. This, in connection with an ardent desire to render as perfect as possible all the manipulations in the practice of our profession, is the only apology I can offer for trespassing on the valuable time of this Convention.

"After having procured a perfect adaptation of plate or base to the mouth, set around on it, on the alveolar ridge, a rim of wax, as near the position to be occupied by the artificial teeth as judgment may dictate, being careful to have this rim of wax adhere to the plate or base so as not to be displaced by the operations of taking the articulations; then, while the plate or base is in its correct position in the mouth, direct the patient to swallow, or perform the act of deglutition, and retain the jaw in the same precise position of occlusion as it was on completing this act of swallowing; then, by parting the lips, you will perceive the relative position of the jaws, in an exact situation for a correct articulation. As nature herself, by this operation of swallowing, produces an equalization of motion in all the muscles that move the jaw; as there is as much distinctive individuality in the peculiarity of the voice, as there sometimes is in the singularity of the position of the teeth, an imperfect articulation of an artificial denture, producing an effect on the tempero-maxillare joint, will almost entirely obliterate this distinctive personality, and renders a correct articulation of artificial teeth positively necessary to preserve that individuality so peculiar to many persons; therefore the more perfect and natural an arrangement of teeth and articulation is procured and preserved, the more complete and harmonious will be that distinctive individuality, which is frequently changed, if not entirely destroyed, by imperfect articulations from artificial dentures."

Drs. Atkinson, Perine, and Franklin were appointed a committee upon the question of appointing Dentists in the Navy and Army.

The committee on the London correspondence reported the following letter in answer:—

New Haven, Ct., August 8th, 1861.

Messrs. Waite, Rymer, and Hockley, College of Dentists, London.

Gentlemen:—The undersigned, a Committee of the American Dental Convention appointed to reply to your letter addressed to this body, beg leave respectfully to say that the fraternal and cordial spirit of your communication has afforded the Convention the most sincere pleasure, and inspired its members with renewed, and, if possible, higher regard for the professional brethren in England.

The Committee are requested to return grateful thanks for the very kind manner in which you have been pleased to tender a welcome to American Dentists at the proposed General Convention in 1862, and will be happy to make such response as the circumstances of the future shall allow.

With the highest esteem, gentlemen, for yourselves personally, and for the distinguished body you represent, we have the honor to subscribe ourselves very faithfully and gratefully yours,

(Signed) T. L. Buckingham,
Chairman Committee Am. Dental Association.

On motion of Dr. Franklin, it was

Resolved, That the officers of the American Dental Convention extend a cordial invitation to the Dentists throughout the United States, to attend the World's Dental Convention, to be held in London, in 1862.

On motion, adjourned to Friday at 9 A.M.

FOURTH DAY—MORNING SESSION.

The President called the Convention to order at nine o'clock, the usual half hour being devoted to the consideration of inventions.

Dr. Hill spoke of the advantage of the material known as "Hill's Stopping," and thought no dentist could afford to be without it, as it was invaluable as a temporary filling; and had so perfected it, that it was impermeable and water-tight; also showed the method of properly introducing it.

Dr. Asay presented his method of attaching teeth to metallic plates by means of hard rubber.

Dr. Searle presented an approved mode of recording dental operations.

The committee on "Appointing Dentists in the Army and Navy" reported that the subject appeared to them of so much importance that it was necessary that more time should be given to consider it than the present session would admit of.

On motion, the committee was continued with discretionary powers, and Drs. J. D. White and I. J. Wetherbee were added to the committee.

The next subject in order was taken up, being "The various plastic materials for filling teeth: their relative or individual merits."

Dr. White referred to the article published in the August number of the DENTAL COSMOS for 1861, upon the oxychloride of zinc, as the merits of the material were honestly, though modestly enumerated. He was, at first, opposed to the use of these materials, but Dr. Metcalf had sent to him a small quantity, which he had used. In the first case, the filling, after being in eighteen months, continued sound, there being no permeation, shrinking, or cracking; in another case, where a tooth had been filled with gold without arresting decay, the oxychloride was introduced, and the patient thought the tooth felt more comfortable, and the decay did not continue. Whenever a tooth can be filled with gold successfully, will always use it to the exclusion of other materials. A time was, when every one was disgraced who touched anything but gold, because so many had been deceived, both patients and practitioners; and he was glad that time had passed, and that there was now a disposition on the part of the profession to give all materials a fair trial. When some professor of chemistry said the oxychloride would destroy the enamel and the dentine, he took a tooth and filled it, and on examining it a month afterward, found there was not the slightest change in the dentine upon the walls of the cavity.

Dr. Wetherbee said, his faith was not as large as Dr. White's, for the material had received with him a severe blow, and justice to the profession required him to present the serious objections to its use. He referred to a case, where a dentist had introduced it in five teeth of fair quality, stating that it was better than gold, as this would not expand or contract as gold would do, on taking hot or cold articles in the mouth. After it had been in the teeth six months, he saw the case, and found three of the fillings were out, and one nearly so, while the teeth were sensitive; the decay being quite deep. The remaining one was left in, and at the end of three months it came out, leaving the cavity three times the original size. He assured the lady the material should never have been introduced, and was satisfied the osteoplastic had affected the dentine; he subsequently filled the teeth with gold. The article could not be made so that it would not absorb water, and therefore defied any one to make a water-tight filling; and had repeatedly reddened litmus-paper, and even the writing-paper in which it was rolled was discolored from its acid.

Dr. Metcalf asked Dr. W. to what substance in the material he attributed the effect upon the dentine?

Dr. Wetherbee replied, he thought it due to the *oxide of zinc.*

Dr. Metcalf said that, so far as his knowledge of chemistry went, oxide of zinc exerted no action upon the dental structures; about the chloride he was not so positive, but when these were combined, as in the oxychloride, the mixture was perfectly harmless. This was also the view of Prof. Silliman, to whom he had applied when first manufacturing the article. If it was properly made, it would not absorb water; and though he did not consider it would take the place of gold, thought, in some cases, it would be of use. The practice of a dentist should be "eclectic," as what may be invaluable in one case, may be useless in another.

Dr. Whitney asked Prof. Barker for some light upon the chemistry of these substances.

Prof. Barker replied that whatever of knowledge he possessed on the subject was theoretical more than practical. From the mode of manufacture given in the Dental Cosmos, he should doubt very much such a thorough combination of the oxide and chloride in the manner of preparation indicated, as would entitle the substance to the name "oxychloride." The oxide of zinc is perfectly inert, and would not be injurious as a filling. The chloride is an active agent, zinc hardly neutralizing the chlorine more than did hydrogen. Chloride of zinc is the material used as a soldering fluid by braziers, to dissolve the scale of oxide and render the metal bright for the union of the solder. Judging from its active properties, he thought its action would be decidedly injurious to teeth. From Dr. Wetherbee's statement that the osteoplastic had an acid reaction, he inferred that the mixture was not made in just the proportions to insure no excess of its components.

Dr. White said, he was probably the first in this country to use chloride of zinc. He placed a tooth in a solution of chloride of zinc for three years, and he thought it was rather improved when it came out, though it was sound enough before. If the chloride removes the animal matter, this is what we want to get at. He used to be told that sugar was bad for the teeth, but since he grew older he had seen its falsity, and even had incorporated it in a dentrifice, for the sake of its grit.

Prof. Barker stated that in justice to Dr. Metcalf he ought to state that oxychloride of zinc, if properly made, would not, in his opinion, injure the teeth. He said that he supposed the action of sugar was due to its fermentation, whereby it became converted into acetic acid, which would act on the lime salts of the bone. The relative hardness of enamel, dentine, cementum, etc. would cause the action of corrosive agents to vary immensely.

Dr. Mallett entered his protest against its use.

Dr. Stephens thought it useful, if it would save teeth that could not otherwise be saved; but too much should not be claimed for it; too many in the community held it up as better than gold for filling. Dr. Metcalf was too honest to offer any article which was not in his hands valuable.

Dr. Smith, of New Haven, uses it when he thinks he can save a tooth with it, that could not be filled with gold. He considered Dr. Metcalf's preparation the best one, and had used it with good results.

Dr. Roberts believed it to be of value where teeth were exceedingly frail, not of course equal to gold, but its advantage was that it could be introduced where gold could not. It was the duty of the dentist to use what was the best material for the individual case, and his judgment must determine that. He related a case in his own mouth, where a gold filling was unsuccessful, and a bone filling subsequently introduced perfectly preserved the tooth.

Dr. Hayes asked Prof. Barker if a decomposition could not take place between the oxychloride of zinc and the phosphate of lime in the teeth.

Prof. Barker replied that we have no evidence that such a change did occur. But even if it did, the interchange of elements would break up the arrangement, and so disintegrate the tooth.

Dr. Buckingham had experimented with the different plastic materials, and found them composed of nearly the same chemical constituents. The great difficulty in manufacturing it was to obtain a uniform result, sometimes producing a substance as hard as a stone, and in others it would fail to harden, owing to impurities in the oxide of zinc; again, if the chloride be in excess it will be constantly tasted, the animal matter of the tooth will be destroyed, and the filling will fail. The fluids of the mouth vary, and in some cases will be acted upon more than others. He, therefore, in view of these objections, preferred to use some other material, though he would take issue with Dr. Wetherbee as to his objections, which might as well be urged against arsenic and numberless other articles of the U. S. Pharmacopœia; indeed the objection had been urged to arsenic being placed there because its indiscriminate use would be disadvantageous. He had used the oxychloride as a temporary filling to remove the sensitiveness of dentine with good results, leaving it in from one day to two weeks.

The next subject was then taken up, being "Hæmorrhage after Extracting Teeth, and its Treatment."

Dr. Atkinson referred to the invaluable styptic which has lately been introduced, viz., persulphate of iron, with which the most obstinate cases of bleeding can be easily controlled.

Drs. Burras, Whitney, Buckingham, Barker, Asay, Wetherbee, Roberts, and Hill gave their methods of treatment.

On miscellaneous subjects, relating to surgical dentistry, Dr. Franklin read an amusing poetical paper, on the advantages of artificial dentures after the failure of operations to save the teeth.

Dr. White, in answer to a question, said he had never met with a case of discoloration which he thought due to the use of arsenic; and did not fear to use it in cases of sensitive dentine. At one time, he would admit, his mind was trammeled with theory, but that time had passed by. He was free to confess he could not get along without using arsenic, and did not see how others could do so. The various theories that had been introduced failed to account for the sensitiveness of dentine, but thought it due to the presence of nerve fibres in the tubuli. For twenty years he had been practicing where the use of arsenious acid was condemned for destroying sensitiveness; uses it dry (after having been thoroughly triturated in a mortar) in the cavity, keeping it in with cotton or wax. The delicate nerves which have been seen by Mr. Tomes, and by him described, are destroyed, but the bone is not acted upon. True, he might sometimes kill a pulp, but would say that he saved a great many that otherwise would have died. In the approximal cavities of front teeth does not use it, but uses creosote or chloride of zinc—never uses creosote and arsenic together.

Dr. Atkinson said that when dry arsenic is put in a cavity, it will become a solution by the affinity which exists between it and some of the chemical equivalents of the tooth. He thought, from his own investigations, and also from those of others, that no nerve fibres could be found in the tubuli. Sharp, quick cuts with an excavator will often relieve the sensitiveness, though he uses undissolved iodine, and sometimes a covering of Hill's stopping. Referred to the importance of having pure creosote, a good test for which is olive oil, dissolving without leaving a precipitate, and said he never filled any cavity without first having wiped it out with creosote.

Dr. Butler said, after using arsenic, either for destroying a pulp or for sensitive dentine, always uses a solution of iodine, leaving it in the tooth for a few hours. The fluids of the mouth will remove the discoloration, the iodine will also relieve the irritation, and neutralize the effect of the arsenic.

Adjourned to meet at three o'clock.

FOURTH DAY—AFTERNOON SESSION.

At the appointed hour the Convention came to order.

The next subject in the order of business was taken up, "Surgical preparation of the mouth for Artificial Dentures; should the roots of broken and decayed teeth always be removed?"

Dr. Butler instanced several cases where he would not extract roots of broken front teeth, but preferred to fill and leave them, that the natural expression of the face might be preserved, and absorption be prevented.

Dr. Roberts considered the question could be answered both by yes and no, and thought the word "always" should have been stricken from the question. In preparing the superior arch for an artificial denture would always extract all roots; but would not, in every case, in the inferior one He instanced cases where he would prefer to fill the root rather than to remove it.

Dr. Atkinson said, experience was the best teacher, and his own had taught him that if he wishes to retain the natural expression of the mouth, the fangs had better be left, if they are perfect down to the edge of the alveolar process. The points of insertion of the muscles are also retained, which is of great importance. When nature in her efforts pushes out these fangs, he cuts them off even with the process; they were also valuable in equalizing the pressure of the artificial plate.

Dr. Sutton considered there were cases where it would be best not to extract fangs; where, for instance, there was a short lip, and considerable gum was exposed, the fangs, if left, would contribute to a better expression.

Dr. Hayes related a case where he left two roots in the superior arch—the patient refusing to have them removed—over which he placed a set of teeth; it had been worn for twelve years successfully, and he kept cutting them off from time to time.

The next question, "When shall we insert Pivot Teeth?" was passed over, Dr. Franklin only stating it should be done when we have a perfectly sound root, and the operation can be performed satisfactorily.

The next subject, "The relative merits of the various materials used as a base for artificial dentures, and the method of mounting them," was taken up for discussion.

Dr. Whitney said, his experience had been formed by many years' use of silver, gold, continuous gum, and vulcanite work. Of all these he preferred the last named, thinking it superior to anything else. If the impression is perfect, we could be sure of a fit in every instance. The twang, which was so much of an objection in other materials, was in this obviated, besides the cost was not so much to the patient, and it yielded as large a profit as other work to the dentist.

Dr. Parmele said, he had worn the rubber work, and it produced in his mouth a nasty, sour, and sickening effect; the same experience was produced in the mouth of one of his own patients. He did not consider vulcanite to be equal to either gold or silver—indeed thought it valueless.

Dr. Roberts said, all were not constituted alike, and we should only use what was the best for the individual case. His own experience had taught him nothing was equal to Allen's continuous gum work, when properly made.

Dr. Mallett said, he had been the first to experiment with rubber for artificial dentures in the United States, having perfected it and used it for the last six years. This was a year before Dr. Putnam, of New York, began, and he, therefore, had no claim to the invention. He also referred to the claims of other "so-called inventors." The longer he used the vulcanite work the better he was pleased with it, and this was also the testimony of his patients, many of whom had worn other materials.

Dr. Hill corroborated the facts in reference to the first use of rubber work by Dr. Mallett, he having seen many of the experiments of that gentleman. He believed it to be a very valuable article, but thinks continuous gum work the most beautiful, and the nearest to perfection.

Dr. Buckingham said that Dr. T. W. Evans, of Paris, claimed to have been the first to vulcanize rubber plates, and to have manufactured the first set of teeth for Mr. C. Goodyear.

Dr. Allen, at the request of the Convention, gave at some length his method of manipulating; presenting many valuable and interesting hints necessary to success with the continuous gum, and closed his remarks by stating his reasons for a preference to continuous gum work; his confidence increased the longer he used it, and had no difficulty in obtaining perfect fits.

Dr. Franklin said, the relative value of different kinds of work can only be determined by the amount of good that can be accomplished. His own preference was for vulcanite, and time had proven its purity and indestructibility. The vulcanite work had the same difficulties to contend with in the beginning that continuous gum work had, viz., from the worthless gum palmed off on the profession and public, and the ignorance of the proper vulcanization. The object of many was to vulcanize in too short a time, which, at the high heat necessary, would spoil the gum. Thought the adaptation of plates excelled all others, though care was necessary to attain perfect results.

Dr. White said, not having had time to experiment with it himself, he had concluded to wait until the article had been perfected, but for the last two or three years had thought favorably of it. The great difficulty, in all these materials, is, that the inventors claim too much for them.

Dr. Atkinson said, we all have a prejudice against new things, but that the statistics of success could be the only sure guide to determine which was the best; therefore, as these cannot be obtained, we shall still be in the dark. For entire dentures, he considered the continuous gum on a platina base unparalleled. In the vast majority of cases, vulcanite, its price considered, stands as unparalleled. For under sets, he thought nothing so good as rubber. For upper partial sets, he preferred gold. For entire sets, with "plumpers," as they are termed, he preferred continuous gum, and next rubber.

Dr. Allen said, platina plates, after being struck up, should be placed in acid before being subjected to heat. If this is not done, the foreign metals, which have incorporated themselves in the platina, will give it a rough and dark appearance.

Dr. Searle referred to an interesting case, where he could get no adhesion of the plate to the roof of the mouth. Succeeded in so doing by fitting an oiled silk valve to the air chamber.

Miscellaneous subjects being taken up, a discussion ensued, whether the weight of a set of teeth was a disadvantage. Drs. White, Burras, Allen, and Franklin concurred in saying that it was not a drawback.

Dr. Butler referred to the importance of properly selecting teeth.

Dr. Crossett, at the request of many members, addressed the Convention. He said he came from California to receive, rather than impart instruction, and had derived benefit sufficient to repay him for coming. If agreeable, he would give a short description of the progress of dentistry in his own State. When he went there the profession generally were using quartz fillings and other materials where gold should have been introduced, but now a better practice was being adopted, and all base articles were confined to their appropriate places. There exists at this time a prejudice against the use of vulcanite, and but two individuals use continuous gum work.

On motion, a vote of thanks was tendered to Prof. Barker for the interest he had added to the session. Also to the press of New Haven, and especially the *Journal and Courier*, which gave an interesting report of each session.

The hour (six o'clock) having arrived for which the hall was rented to other parties, the President, after a few congratulatory remarks, put the question for final adjournment, and with seeming reluctance the Convention adjourned *sine die.*

It would be unjust were we not to state that our report fails to do credit to many of the most interesting discussions of the Convention, several of which were of a conversational character, and could not be reported. The uniform attendance and interest on the part of the members, and particularly of the ladies, was deserving of great praise, and contributed much to its happy character. The place selected (New Haven) was, we think, unexceptionably the very best that could have been chosen, as the kindness received by the members of the Convention both from those of our own and other professions will attest.

EDITORIAL.

OUR VISIT TO THE AMERICAN DENTAL CONVENTION.

For the first time, we attended the American Dental Convention, since its formation in Philadelphia, seven years since. It convened at New Haven, Conn., on the first Tuesday in August, at ten o'clock A.M. We must confess that the place of meeting was well selected. New Haven is a most beautiful and classic spot. The cordial manner in which the Convention was received by the heads of the public institutions will ever be gratefully remembered by every member of the Convention. There was a much larger attendance than was anticipated, considering the disturbed state of the country. Never before, perhaps, did so large a body of men assemble together and discuss the various topics of their profession or pursuit with so much good feeling toward each other; it was a most sublime spectacle to see such unanimity and respectful sentiment prevail for four consecutive days of discussion, among so large a number of members of the same profession, and comparatively strangers to each other. It illustrates most clearly how intimately the different members of our noble art are cemented together in purpose and in mutual welfare for each other, from the remotest parts of our country, and every grade in our profession,—all of which is referable to the system of societies, conventions, and a periodical dental literature.

There may be a degree of *business* antagonism between members of the profession, who are more or less connected or engaged in the mechanical improvements of the day, which is not as pleasant as it might be, but this must not be noticed, unless it becomes personal and selfish; a similar antagonism exists among operative dentists also, and where it is respectful, it can do no harm. Mechanical dentistry is so large and important a branch of the dental art, that their separation is impossible, so intimately are they blended. Some of our best operators have been inventors of important mechanical improvements and auxilaries of our art, and their exclusion from one and the same society or convention as members with operative dentists would be as unreasonable as to deny their usefulness to the world. The march of our profession is onward, and it is the duty of every member of it to put his shoulder to the wheel, and exert his whole energy to push it forward to full development. As the views and practices of the members of our profession were confused and illy understood when it first arrived at manhood, it is not surprising that a great deal of difficulty attended the first efforts in the formation of societies; members of the profession were wary and even jealous of each other; if one had gained the confidence of the community in which he practiced, he rated himself as better than another, no matter how humble his origin. It must be recollected that every one in our profession has his individual reputation to make by his acquirements and work of his own hands, and the way he deports himself through life, and he ought to be respected proportionably as he manifests an honest effort to acquire and to do. The citation of our own case, which led to our introduction to the old American Society, will illustrate the false basis on which it was founded. After we had been in practice about twelve years, the late and lamented Townsend called upon us to make our acquaintance; he remarked that as he was the elder of the two, it was his duty to make the advance, and that we were one of the "*rare few*," whom he was "willing to take by the hand." This entitled us to an introduction to the society of which he was a member—the old American, and composed of the *rare few!* There are no rare few in our profession, except the willfully ignorant, self-important, indolent and selfish, and their proper place is *out* of, not *in* the society of liberal-minded and intelligent men. Still, it is much to be lamented that a number of the most experienced and best operators in our profession are not active members in some society, or the annual conventions; this should not be, and how it is to be remedied, we are unable to devise at present; we are quite sure that the fault does not so much lie in individual indisposition to association as in a misapprehension of one another's views and feelings toward each other. Members of the profession meeting together as strangers have not been careful enough of each other's feelings and opinions; and doubtless others have been too sensitive of their own views and practices, and have allowed themselves to become antagonistic before they were properly understood. A fair respect for each one's opinion, and a proper reward of merit and praise for new inventions and improvements as they are advanced, would hold men together and secure the interests of all much faster than a cold approval, or systematic detraction. In plain terms: we regard a dental convention or society more as a *repository* for the rich fruits of each other's labor acquired in the broad fields of our profession, rather than a place for *discussion*—where each one vies with the other in how much he can offer at the shrine of his noble art—and the discussion be the interchange of those kindly and generous sentiments which shall have a tendency to bind all together in one common brotherhood. J. D. W.

REMOVAL.

We learn that Dr. B. Wood, who for some years practiced dentistry in Nashville, Tenn., and also edited the *Southern Journ. of the Med. and Physical Sciences*, has removed to Indianapolis, Indiana, where he will resume the practice of his profession. Dr. Wood has had much experience in operative and mechanical dentistry, in both of which branches he has attained an enviable reputation. We wish him success in his new home. J. D. W.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

Dr. Edward Hudson.—To most, if not to all, of our readers the name of Edward Hudson is familiar, as one of the pioneers of dental surgery in America.

Believing that there are many merely knowing him by name who would derive pleasure and instruction from perusing an excellent sketch of the life of this eminent practitioner, written by the late Dr. Elisha Townsend, we republish it, along with some interesting notes taken from the "Memoirs, Journal, and Correspondence of Thomas Moore," which, to the best of our knowledge, have never been presented to the dental profession.

It is quite gratifying, in connection with the tribute which Dr. Townsend pays to the professional worth and gentlemanly characteristics of Dr. Hudson, to be able to add the testimony of one of the world-favorites, who knew him intimately in early manhood, with regard to his talents, accomplishments, and devotion to the cause of liberty.

It must be admitted that Moore pays a high compliment to the talents of his friend, when he says, "I attribute, indeed, a good deal of my own early acquaintance with our music, if not the warm interest which I have since taken in it, to the many hours I passed, at this time of my life, *tête-à-tête* with Hudson—now trying over the sweet melodies of our country, now talking with indignant feeling of her sufferings and wrongs."

At this period no doubt the germ was planted in Moore's breast which eventually culminated in those world-wide and world-admired songs, the Irish, National, and Sacred Melodies—songs which place him among the first, if they do not make him *the* first, of British lyric poets; for, as Lord John Russell truly says, "never has the English language, except in some few songs of the old poets, been made to render such melody; never have the most refined emotions of love, and the most ingenious creations of fancy, been expressed in language so simple, so easy, and so natural." It would be assuming too much to assert that those songs never would have been written but for his acquaintance with Hudson. From Moore's own testimony, however, it is reasonable to infer that his intimate association with Hudson gave a direction to his mind which eventually led to their production. Greater results have frequently had their origin from influences much less important than those were.

The extract from Moore's letter to his mother presents another fine trait in Hudson's character, viz., the consistency and devotion with which he adhered, in his adopted country, to the republican sentiments avowed in Ireland, and which had made him a martyr, and an exile from his home; and it is not difficult to conceive why Moore had reason to say, "I feel awkward with Hudson now; he has, perhaps, had reason to confirm him in his politics, and, God knows, I see every reason to change mine." Unfortunately for the poet, the Prince Regent had noticed him, and the nobility of England, from the highest to the lowest, had flattered and caressed him to such an extent that they sapped his vertebral column, and he was unable to stand up before the true and sturdy associate of former days.

Possessing, as Hudson unquestionably did, natural endowments, extensive attainments, and an enlarged experience which eminently qualified him to contribute to the science of the profession, it is a matter of regret that he did not place something on the written page which might have advanced the interest of science and lightened the labors of less favored practitioners of his own and the present day. This remark, however, is not made in the spirit of fault-finding, for it must be admitted that one who rendered such valuable and lasting service as an operator that his work stands as an enduring monument, worthy of imitation, and his name is mentioned with a respect almost amounting to veneration by the community and the profession thirty years after his body was laid in the grave, might claim exemption from the discharge of duties which, to a great extent, are regarded as binding upon those engaged in the practice of the profession at the present period. Again, isolated as he was, with few if any professional associates, he lacked that stimulus to exertion which is ever found in societies established for the cultivation of science. There can be little question, however, if the material had existed for the formation of such associations, and steps had been taken in that direction, that his ardent temperament would have carried him into such a movement *con amore*, and that his unwavering steadiness of purpose would have kept him at his post, as an indefatigable and valuable coadjutor, until the day of his death.

His sphere of usefulness was extended, but it might have been boundless, had he taught others how to produce the results which have placed his own name in such an enviable position in the estimation of his patients and the profession he honored.

With these prefatory remarks, we invite attention to the excellent sketch by Dr. Elisha Townsend, and the notes already referred to.

"Edward Hudson, late surgeon dentist, of Philadelphia, was born in the year 1772, in the County of Wexford, Ireland. His parents, it is believed, were members of the religious Society of Friends, and although left an orphan at an early age, the principles implanted in his mind by his connection with this proverbially honest and upright sect, appeared to germinate, and in maturer years to produce appropriate fruit.

"He was remarkable for blandness of manners, an equanimity of temper, which nothing seemed ever to disturb, and a simplicity of character, combined with great steadiness of purpose and unbending integrity, which secured for him numerous friends, and caused him to be respected and beloved wherever he was known.

"A cousin, established as a dentist in the City of Dublin, and who stood in the foremost rank in his profession, adopted young Hudson as his son; and soon after entered him as a student at Trinity College.

"His studies here were pursued with ardor and delight, and the result realized the fondest hopes of his guardian, himself a man of very considerable classical and literary attainments. Under the kind and judicious care of his relative, Mr. Hudson rose rapidly in qualification for his profession, and his future fame and eminence were confidently predicted.

"While residing in the house of his cousin he practiced dental surgery for a considerable time, until he was arrested at the house of Mr. Oliver Bond, and imprisoned by order of the government, a circumstance for which we shall presently account.

"At the hospitable board of his instructor and friend, he had the advantage of constant communication and intercourse with men distinguished for literary, classical, and scientific attainments, his cousin's house being a resort for the elite of Europe, who in him hailed a congenial spirit.

"While at college Mr. Hudson became a member of several of the debating and historical societies established about this time in the City of Dublin. He thus became associated with many of the most celebrated and distinguished literary luminaries of the age—among these may be enumerated Tom Moore the poet, the Emmets, the Shearses, the Corbetts, and others. With these Mr. Hudson was on terms of the greatest intimacy and friendship.*

"He soon became known as a writer and debater, and, as the association was established upon the basis of a reciprocal interchange of sentiment in all matters connected with the well-being of society and the interest of mankind at large—being, in short, thinking men, and men, moreover, whose object was to devise means to render their fellows wiser and happier—it followed as a necessary consequence that views were promulged so liberal in their tendency and anti-aristocratic in their scope, that the Anglo-Irish government became alarmed; and, in unison with its settled policy to suppress every expression of sentiment calculated to open the eyes of the people to the tyranny of their rulers, the Lord Chancellor Clare exercised his prerogative by ordering the dissolution of both the societies, and the banishment of such members as were most obnoxious to the censure of the government.

"Many of those who remained, however, soon became active members of the society of United Irishmen, and among them Mr. Hudson took a prominent and distinguished part.

"Some of these men, as is well known, expiated with their lives their devotion to their country and their love for their fellow-men. Some suffered long and painful incarceration in the filthy jails of the metropolis, and many more were compelled, after becoming convinced of the inutility of further labors, to fly their country, and seek liberty and happiness in other lands.

"To this necessity were we indebted for the residence of Dr. Hudson in the City of Philadelphia. But, unlike some others, he was not permitted to expatriate himself in his own time and way. His first determination, after he had become a mark for the shafts of tyranny and oppression, was to settle himself in London, in order to pursue the practice of his profession; but ere he could depart, he, with twenty-two other leaders of the United Irishmen, were seized and transported to Fort George, in Scotland, where they were confined until the peace of Amiens, in 1802.† While confined in Fort George he was visited, professionally, by many of the nobility and gentry of the surrounding country, and so well satisfied were they of his skill and integrity, that not only were large fees paid him very cheerfully, but great regret expressed, when, by his liberation from confinement, his services could no longer be obtained.

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* "Among the oldest acquaintances and friends of my father and mother were some of those, as I have before stated, who were the most deeply involved in the grand conspiracy against the government; and among the new acquaintances of the same description added this year to our list were Edward Hudson—one of the committee seized at Oliver Bond's in 1798—and the ill fated Robert Emmet. Hudson, a remarkably fine and handsome young man, who could not have been at that time more than two or three and twenty years of age, was the nephew of Hudson, a celebrated Dublin dentist. Though educated merely for the purposes of his profession, he was full of zeal and ardor for everything connected with the fine arts; drew with much taste himself, and was passionately devoted to Irish music. He had with great industry collected and transcribed all our most beautiful airs, and used to play them with much feeling on the flute. I attribute, indeed, a good deal of my own early acquaintance with our music, if not the warm interest which I have since taken in it, to the many hours I passed at this time of my life *tête-à-tête* with Edward Hudson—now trying over the sweet melodies of our country, now talking with indignant feeling of her sufferings and wrongs"—*Memoirs, Journal, and Correspondence of Thomas Moore, edited by the Right Hon. Lord John Russell, M.P.*, p. 35.

† "Among the many fearful and painful events that had, before then, succeeded each other so rapidly, there was none that had more surprised and shocked us than the apprehension of our manly and accomplished young friend, Hudson, among the delegates assembled at Oliver Bond's. That meeting was, if I recollect right, to be the last before the delegates should disperse, each to his allotted quarters, for the great general outbreak; and the watchword of admission (which Reynolds betrayed to the government) was, 'Where's M'Cann? Is Ivers from Carlow come?' Major Sirr was, I believe, the officer who knocked at the door and gave this watchword; and I have heard from authority on which I could depend, that when he entered the

"After being released from this long and tedious imprisonment of four years' duration, Dr. Hudson abandoned his original design of settling in London, and came to Philadelphia.

"He commenced the practice of dental surgery some time after his arrival in that city, where he found but one gentleman who had obtained the full confidence of the public, the late Dr. James Gardette, a practitioner of high standing in his profession, of acknowledged skill, combined with great scientific attainments, which, together with his honesty and integrity, rendered him in every way worthy of the reputation he enjoyed. During the earlier years of Dr. Hudson's residence in Philadelphia, he was induced, probably by glowing accounts and representations of sudden acquisition of wealth, to engage in two distinct partnerships. Neither of these seems to have been fortunate; possibly on account of injudicious speculations, but more probably from a lack of commercial skill and tact, so far, at least, as Dr. Hudson was concerned, for all experience has proved that men educated for, and possessing skill in, any of the learned professions, are almost necessarily deficient in the peculiar talent and acumen necessary to secure success in mercantile or monetary speculations. His first partnership connection was with his father-in-law, Mr. Patrick Byrne, with whom he embarked in the stationery business. This, however, was soon relinquished.*

"At a subsequent period he engaged in brewing, with a gentleman in whom he reposed the utmost confidence, both as to integrity and knowledge of the peculiar duties appertaining to this art. For a time the firm seemed to be in a prosperous condition, but became suddenly and deeply involved, and that to an extent for which no remedy remained except the last and most trying one, the relinquishment of the whole business into the hands of the creditors.

"This failure was said to have been owing to gross mismanagement on the part of the senior partner, but we believe no charge of want of integrity was ever intimated.

"The firm paid a percentage on its debts, and received a unanimous release from all its liabilities.

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room, my poor friend Hudson fainted; showing how little a stout heart and Herculean frame (both of which Hudson possessed) may be proof against sudden alarms, or exempt their owner from such outward signs of feminine weakness."—*Ibid.*, p. 42.

* "I shall leave this place for Philadelphia on to-morrow, or the day after. I shall see there poor Edward Hudson, who, if I am rightly informed, has married the daughter of a very rich bookseller, and is taken into partnership by the father. Surely, surely, *this country* must have cured him of republicanism.

"I have brought this letter on with me from Baltimore, as there was no opportunity likely to occur from thence. I traveled all night in one of the most rumbling, wretched vehicles. O dear! I am almost tired of thus jogging and struggling into experience. I have seen Edward Hudson: the rich bookseller I had heard of is Pat Byrne, whose daughter Hudson has married; they are, I believe, doing well. I dine with them to-day. Oh, if Mrs. Merry were to know that! However, I dined with the Consul-general yesterday, which makes the balance even. I feel awkward with Hudson now; he has, perhaps, had reason to confirm him in his politics, and, God knows, I see every reason to change mine. Good-by, sweet mother. Your own everywhere."—*Extract from Moore's Letter to his Mother, dated Baltimore, June 13th,* 1804, *and Philadelphia, June* 16*th.—Ibid.*, p. 76.

"After the first misfortune, Dr. Hudson immediately resumed the practice of the profession which he had originally chosen, and for which he was so eminently qualified both by natural genius and education.

"He did not relinquish his practice on entering into the second partnership, but continued to pursue it during the whole time the connection existed—the majority of his former patients and friends gladly returning to him as soon as it was known he had resumed the duties of his office.

"This enabled him to liquidate every claim which this unfortunate speculation had created.

"And never did any man more heartily rejoice to feel himself free from such incumbrance. The desire to accomplish this noble 'duty,' as he thought it, had weighed on his mind constantly from the time of his failure, and had rendered his days anxious and his nights sleepless.

"This duty was unwaveringly performed; and not only were the debts extinguished, but the interest on them was paid to the last farthing.

"Although this was simply an act of justice, and as such requires no laudatory notice, it nevertheless gives us great pleasure to record it, as it speaks trumpet-tongued for the good faith and uprightness by which this noble and pure-hearted man was ever distinguished. The virtue of strict and uncompromising honesty is so rarely practiced in our degenerate age, that even as an example to others, when a brilliant instance like the present occurs, it seems well to give it publicity, for in this case it will be recollected that Dr. Hudson was not *legally* bound for a dollar of the money which he disbursed with such alacrity and good-will.

"From this time, Dr. Hudson resumed the cheerful and bright-hearted temperament which had been habitual to him, but which, in consequence of the many and sad reverses to which he had been subjected, added to severe domestic afflictions, it was feared by his friends he had lost forever, and from this period also his professional business rapidly augmented and his circumstances became easy.

"He was realizing a handsome competence, and in his case it should seem that the adage that 'rogues succeed in business better than honest men,' was not verified; and his friends felt convinced that Providence had indeed smiled upon the man who, in the sincerity of his heart, had striven to 'do unto his neighbor as he would have his neighbor do unto him.'

"The personal appearance of Dr. Hudson was highly prepossessing. Taller than ordinary, his fine figure was well proportioned and graceful, and the nobility of his soul was fitly indicated by the outward grace and dignity of his bearing.

"Dr. Hudson died in January, 1833, at the age of sixty-one years, deeply lamented not only by his immediate family, but by a large circle of attached and devoted friends, among whom were numbered many of the wealthiest and most distinguished of the scientific and literary persons resident in Philadelphia.

"All who knew him intimately, respected and prized him for the exceeding goodness and sincerity which shone so brightly conspicuous in his character. By his patients he was idolized as few of his professional brethren can ever expect to be.

"All who approached him were delighted with the blandness of his manners; all could see at a glance there was nothing approaching charlatancy visible in his opinions or practice.

"His advice was imparted with a modest bearing which charmed, but with a quiet confidence which carried a conviction of his admirable skill to the minds of all by whom he was consulted. We are aware our words fail to do justice to the many excellencies and virtues which distinguished Dr. Hudson. To those who knew him they are not needed; to those who knew him not, what has been said may serve to give a faint idea of the character of this most excellent man and truly eminent dentist."

THE DENTAL REGISTER OF THE WEST—JUNE.

"FILLING TEETH. Read before the Kentucky State Dental Association, April 9, 1861. By DR. W. M. ROGERS.—In the course of this paper, I have indicated a preference for the slight enlargement of the interior of cavities in preparation for filling. This preference is founded upon an idea that, in addition to the many causes which conspire to the destruction of fillings in the teeth, there is one not generally noted, to which I ascribe importance.

"With some hesitation I assert it, that the difference in the expansibility of dentine and enamel from that of gold, under the varying degrees of caloric to which they are subject in the mouth, considered in connection with the peculiar condition in which most of our operations in filling teeth are discharged from our hands, has a *tendency*, by philosophical necessity, to expel the filling from the cavity during a long process of the operation of these causes. An object held on a strain between two points tends to slide from the grasp of the weaker point to that of the stronger.

"I think it would be found to be a fact, upon investigation, that by far the larger number of our fillings are more thoroughly consolidated at the surface than in the interior, and that as we ascend deeper into a filling, the less of density we find.

"Without being committed to the confession that there is any necessity that such should be the case, it is only pertinent to the present purpose to assert that the fact so exists.

"In the thousands of times in which the temperature of the teeth and the fillings in them is altered in the mouth, the gold in all such cases as these just mentioned, in undergoing contraction, goes from the point of less adhesion—from the direction of the interior—to that of greater consolidation, and consequently of greater security, in the direction of the surface. It is true that if we suppose for the moment that the gold is undergoing expansion from an elevation of temperature, then it may be elongated in the direction of the lesser resistance and toward the interior of the tooth; yet the resisting surfaces to inward extension are coextensive with the walls of the cavity, and are always in operation, while any very minute length of the filling, once protruded from the orifice, ceases forever to take part in the action, except it may be made potent in resisting any inward retraction, by virtue of a very slight enlargement on being relieved from the grasp of the orifice. In forming the cavity larger within than at the orifice, I would purpose to remedy this supposed evil. More or less inequality exists in the interior of almost every cavity—a happy fortuity, if what I have said is correct. It will at once be perceived that these intero-enlarged cavities will require especial attention, to the proper consolidation of the interior part of the filling.

"Another remark upon the manner of placing gold in a cavity, and I am done. All that has been said is upon the presumption that the gold is introduced in such manner that the laminæ shall extend from the bottom of the cavity outwardly to the margin. These should extend *directly* out and on as nearly parallel lines as possible, and should have as much lateral consolidation as can be safely given prior to any attempt to consolidate in the direction of the axis of the filling; otherwise the gold, when polished down, will present upon its surface many points at which the ends have been pressed below the disc; and these, being severed from their actual connection with the laminæ, will in time lose their attachments, thus spoiling the beauty of the filling. In proportion, however, as the gold is adhesive, will this result be lessened.

"Having marked out a specific course to follow, which will in itself consume too much, perhaps, of the time of the Association, I have not spoken of many points of interest to myself, and must claim credit for at least this exhibition of discretion."

The extract above is the concluding part of an ably written article on this all-important subject.

While admitting there is an apparent plausibility in the views advanced by Dr. Rogers, that the varying degrees of heat to which the tooth substance and gold are subjected in the mouth has a tendency to expel fillings from their cavities, we are free to confess that though the view has been frequently advanced in our presence, we have never been able to convince ourselves that the position was an unquestionable one.

All bodies, it is true, are enlarged in their dimensions by the application of heat and reduced in size by its abstraction, and although this variation takes place to a comparatively small extent in solids, yet in the construction of works in which metal is largely used, it is a matter of the first importance to make provision for the changes of dimension to which they will be subjected by exposure to the elevated temperature of summer and the depressed temperature of winter. Owing to the fact that there is a great difference in the expansibility among metals when subjected to the same degrees of heat, very valuable applications have been made of it in the construction of instruments, particularly for the accurate measurement of time. Thus in the *gridiron pendulum* there is such a perfect compensation in the different degrees of expansibility between the iron and brass, or iron and zinc bars of which the pendulum is formed, that an invariable distance between the points of suspension and of oscillation is maintained in the alternating temperature to which it is exposed.

MM. Lavoisier and Laplace have carefully investigated the actual amount of expansion which different solids undergo when subject to the same degrees of heat, and they obtain the following results on passing the substances named below from 32° to 212° Fah.

English flint glass	$\frac{1}{1248}$	Soft iron	$\frac{1}{819}$
Common French glass	$\frac{1}{1147}$	Gold	$\frac{1}{682}$
Glass without lead	$\frac{1}{1142}$	Copper.	$\frac{1}{581}$
Another specimen	$\frac{1}{1090}$	Brass	$\frac{1}{535}$
Steel untempered	$\frac{1}{827}$	Silver	$\frac{1}{524}$
Tempered steel	$\frac{1}{807}$	Lead	$\frac{1}{351}$

We do not know what the relative degree of expansibility in tooth substance is when subject to the variations of temperature above, but judge that it is very slight on account of its being a poor conductor of caloric.

On a former occasion we referred to experiments performed by Dr. Flagg and self, to test the correctness of the oft-repeated assertion that the practice of drinking ice-cold water and hot coffee or tea at the same meal is liable to fracture the enamel. As stated on that occasion, several teeth were repeatedly immersed in water at the boiling point, and suddenly removed from that and thrown into ice-cold water, without making an apparent impression upon any of them. Desiring to obtain a section of enamel for microscopical purposes we adopted that course to secure it, but found at last that it could only be accomplished by subjecting the tooth to a dry heat, when the enamel readily separated from the dentine.

If our impression is correct that tooth substance is very slightly affected by the variations of temperature to which it is subjected in the living body, it is only necessary to consider the probable changes produced in gold fillings by the same influences. According to the table presented, when a gold bar is passed from 32° to 212° it is found to expand 1·682 of an inch; in other words, a gold rod 682 inches long would be increased exactly one inch in length—the same ratio of expansion, of course, taking place in every direction. Now, in the mouth, neither gold or anything else is subject to a higher temperature than 140°, and the variation does not start from 32° and run upward, but it commences at 98° (temperature of the mouth) and from that point varies between 32° and 140°, according to the temperature of the solids or fluids introduced. Taking into consideration, then, the infinitesimal expansion which occurs in passing gold *from* the freezing to the boiling point of water, it appears exceedingly doubtful whether the variation to which that metal is subjected in the mouth can be justly regarded as a force sufficiently expulsive to drive fillings from their cavities.

In accounting for this phenomenon it has always appeared much more satisfactory to attribute the result, as has been suggested by others, to the oozing of serum from the dental tubuli behind or underneath the filling. The hydrostatic pressure thus brought to bear against it, particularly when the fluid is subjected to variations of temperature, it is possible would prove a powerful expulsive force.

There are other causes, however, much more likely to favor the dislodgment of fillings than exposure to variations of temperature. Thus, it is not at all surprising to find fillings dropping out of cavities when their parietes are not constructed so as to hold them in place, or when the fillings are introduced in such a manner that the mass is imperfectly consolidated.

We cannot recognize shaping a cavity with the orifice smaller than the interior as a desirable mode of overcoming these disadvantages, however, for it is exceedingly difficult to *thoroughly* fill such cavities, particularly when cylinders or folds, extending from the bottom of the cavity outward, are employed, and it is easy to demonstrate that such fillings almost invariably will be found less and less dense in passing from the surface inward.

A cavity whose orifice is equal in diameter with the interior, and whose parietes are parallel with each other, or when they flare somewhat and thus increase the size of the orifice, by grooving the sides, or drilling, retaining points, every opportunity is afforded for introducing and keeping the filling in situ. And when it is introduced pellet by pellet, each piece thoroughly consolidated before bringing another in contact with it, until the entire operation is completed, if properly manipulated, such a filling, on examination, will be found equal, dense at the external surface, in the centre, or where the gold is in contact with the parietes of the cavity.

We have given utterance to a free expression of opinion on this subject, because it is one in which we feel a deep and abiding interest. At the same time it is far from our wish to be understood as asserting positively that the views advanced are irrefutable.

THE DENTAL REGISTER OF THE WEST—AUGUST.

AT a recent meeting of the Pennsylvania Association of Surgeon Dentists, as many of our readers no doubt will admit, the claims of amalgam as a material for filling teeth were freely, fairly, and dispassionately discussed. No effort was made to give undue prominence to it, or commend its indiscriminate use. It was not advocated as a *sine qua non*, but as a *dernier ressort* in extreme cases; and the views advanced were based upon actual experience, gained by the speakers as the result of years of observation and *experiment with the material.*

On a former occasion, when the subject was introduced to the notice of the association by Dr. Elisha Townsend, several of the members, governed by opinions resting upon the assertions of persons in whose judgment and veracity they had every confidence, took decided ground against its use under any circumstances. Enlarged opportunities for observation and careful examination of the subject since that period having convinced them that their former views were incorrect, they felt it was due to the association, to the profession, and the cause of truth that they should make a candid acknowledgment of the fact. Actuated by motives such as these, while still *ready* and *glad* to receive light from others, on this or any other subject, no amount of invective or ridicule, emanating from whatever source it may, can influence their views, or deter them from giving utterance to their honest convictions.

In the absence of something better, the profession has been favored, in the *Dental Register*, with a series of comments upon the views advanced in the recent discussion. The first of these being of a character in which the time of the writer, the printer, and the reader might have been more profitably employed, we have not heretofore deemed of sufficient importance to make any comments in connection with it. The accompanying communication, however, which is a continuation of the series, is one well worthy of careful perusal; but, in presenting it, we cannot refrain from indulging an expression of regret that one who is so capable of adding to the knowledge of others, particularly in a field so little cultivated as dental chemistry, should be willing to waste so much valuable time in a direction which neither tends to the advancement of himself or others. This is said in all sincerity and kindness, and with an earnest desire to secure the greatest good for the greatest number.

"THE AMALGAM QUESTION.—All are familiar with the fact that amalgam plugs in the teeth are frequently blackened, but many seem never to inquire why. They are content to ascribe the blackness to oxidation. That the discoloration is superficial affords them real gratification.

"Bearing in mind that *mercury* is a constituent of all *amalgams*, it may be profitable to inquire a little into the cause or causes of the discoloration referred to, and to notice some of the probable consequences of it.

"Mercury is ordinarily a white metal, and we are aware of no process by which its color can be very materially changed. In this respect it differs greatly from gold, which can be made to assume any hue, from its own 'golden yellow' to a jet black, notwithstanding the statement that 'pure gold possesses the same color the world over.' It is evident, then, that the discoloration of an amalgam plug is not due to a change in the mechanical arrangement of the particles of the mercury. We are, therefore, to conclude that the blackness results from the combination of some other element or elements with the mercury, or that the mercury has nothing to do with the discoloration.

"It should be borne in mind that the most popular dental amalgam contains tin and silver both, as well as mercury, characterized by strong affinities for some of the non-metallic elements liable to be brought in contact with them. The inquiry must, therefore, have reference to these, as well as to mercury.

"Oxygen, sulphur, and chlorine are the elements most important to be considered in this connection, with reference to their affinities for these metals.

"The question is, what chemical compound or compounds cause the blackness? If a single compound, it is evidently insoluble; for however black, if soluble, it could only blacken the saliva, not the plug.

"Is the black substance a chloride, then? Let us consider. It cannot be chloride of tin; for both of its chlorides are soluble. Nor can it be chloride of silver; for, though insoluble, it is white or grayish. And it is not chloride of mercury, for it is soluble; nor the subchloride, for it is white.

"Is it an oxide? Well, not an oxide of tin, certainly, as the color determines; but both the oxides of silver and the suboxide of mercury are black.

"Is it a sulphuret? The sulphuret of silver and the protosulphurets of tin and mercury are all black, or nearly so. We may conclude, then, to discard chlorine, as an agent in the blackening process.

"Both sulphur and oxygen are capable of acting with any or all three of the metals under consideration, when the circumstances are favorable. Warmth, moisture, completeness of contact, concentration, or rather condensation of the elements, and their nascent condition, may be regarded as some of the circumstances likely to promote the action of these elements on the metals under consideration.

"The first three of these conditions are always present in the mouth, the liquidity of the saliva bringing itself and the substances dissolved in it into the most intimate contact with any solids retained in the mouth. The fourth condition is afforded with respect to oxygen, as the saliva absorbs, and thereby concentrates this element. And as to the last-named modifying circumstance mentioned, that is, the nascent state, the action of both oxygen and sulphur are modified by it in many cases. Hydrosulphuric acid (sulphuretted hydrogen) is very frequently if not usually present in the mouth. It is often exhaled by the breath, and, being soluble in water, it of course is dissolved, to some extent, in the saliva. It is readily decomposed, especially when in contact with substances having an affinity for either one of its elements. As it is decomposed, its sulphur, with all the energy incident to the nascent state, unites with the metals under consideration. And this action is modified by the relative strength of its affinity for the three metals, and by the ratio of their equivalents. If the three affinities were equal, the sulphur would unite with the metals in the proportions of tin, 58; mercury, 101, and silver, 108. But mercury and silver have a stronger affinity for sulphur than tin has; and, therefore, the force of the sulphur is mainly spent on the former two metals. We would conclude, then, that much of the blackness is due to the formation of sulphurets of silver and mercury.

"But all this time the oxygen, concentrated in the saliva, is not idle. In regard to its affinities, it will be sufficiently accurate, for present purposes, to apply the remarks already made in regard to sulphur. Its energies, too, are mainly spent on the silver and mercury. The suboxides of these metals are more likely to be formed, under the circumstances, than the protoxides; and as these are black, dark-colored amalgam plugs are not mysterious.

"It may be well to remark, in this connection, that careful analysis fully confirms the conclusions here arrived at by a process of reasoning, and it might have been sufficient, for some, to have stated this at the outset; but we preferred the present course, as better calculated to impress the minds of our younger brethren, whom we regard as the hope of our profession.

"Much has been said about galvanic action, in the various discussions of the amalgam question; and it is plain that the subject is but little understood by many who talk about it. The dull boy in the grammar school, when puzzled about the classification of a word, contents himself with calling it an adverb; and, in like manner, too many of us, when at a loss in regard to the nature of certain chemical actions, refer them to galvanic influence, and rest content. We have heard of galvanic currents vibrating back and forth, along a gold clasp, till, by their rapid and continued seesawing, they had worn or cut away the tooth. We have listened to much that was but little farther removed from nonsense. Still the question of galvanic action has its place, and is entitled to consideration. Indeed, it is probable that chemical affinity is only another name for galvanic or electric influence. Certain it is, however, that when two metals, in contact with each other, are placed in a liquid which acts on but one of them, or unequally on both, a galvanic current is established. The force of this current is modified by the degree of energy of the chemical action, by the extent of surface acted on or excited, and by the distance of the excited surfaces from each other. There are other modifying circumstances not important to be noticed here."

(To be continued.)

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*On the New Physiological Properties acquired by Divided Nerves.* By M. Claude Bernard, Member of the French Institute; Professor of General Physiology at the Faculty of Sciences, etc.—That the division of the posterior tracts of the spinal cord on one side, far from extinguishing all sensibility in the corresponding regions, produces an exaggeration of the sensorial power, is a fact, the experimental demonstration of which was placed before you at our last meeting. This extraordinary result brings to our knowledge one of the most important laws of life, which, prevailing as it does throughout the entire extent of the nervous system, evidently claims our closest attention. All nerves, separated from the parent trunk, are found to acquire an additional degree of excitability, which for the time being renders them infinitely more sensible to the action of external stimulants than in the healthy state.

"But, in order to understand the general considerations into which we are about to enter, you must always bear in mind that sensibility, viewed as a physiological property of the nervous system, is altogether distinct from pain, and frequently reveals itself by producing effects of a totally different nature. The organs of vision afford a striking instance of this; and the same may be said of the spinal cord, which transmits the impressions made upon the nerves, but receives none, from the direct action of external causes. We meet, therefore, with certain special properties in nerves, which bear no reference to the mind, which are independent of the will, and of which the subject is quite unconscious: they continue, therefore, to exist in nerves which no longer communicate with the central apparatus of sensation and motion. In other words, nervous excitability, and the transmission of its effects, must not be confounded with the mental operation which perceives them, after they have been produced; to this latent sensibility, to these involuntary movements alone, are the following reflections to be referred.*

"We place before you the frog on which the unilateral division of the spinal cord was performed the other day; and you will be able to judge at once of the difference existing between the sensibility of the lower limbs, in this animal, and in another Batracian, which has not been interfered with.

"[The posterior extremities of these two frogs being dipped into acidulated water, the former draws up its leg on the wounded side, while the other allows both limbs to remain immersed in the liquid.]

"But if the sensorial power has in this manner been increased, the powers of motion have also shared in the process. When separated from the central part of the system, motor nerves are always found to acquire a higher degree of excitability; a fact which may easily be demonstrated by the following experiment: After selecting a subject in which the spinal cord has not been interfered with, one of the posterior limbs is amputated; that is to say, both muscles, vessels, ligaments, and all other tissues are divided, excepting only the sciatic nerve: the galvanic stimulus is then applied, and the degree of intensity required to act upon the muscular element is measured by means of a graduated apparatus. When this has been done, the amputated limb is completely separated from the trunk, by dividing the sciatic nerve, which alone connects it with the body; and galvanism being a second time brought to bear upon it, contractions are excited by currents infinitely less powerful than in the first instance. It will also be found, in making this experiment, that as long as the nerve remains intact, the effect takes place at the moment when the circuit is closed; but that after dividing it, contractions are produced both in opening and in closing the circuit, a difference which can only be attributed to the physiological modifications arising from the operation.

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* It is of course fully understood, that the unilateral section of the spinal cord, and similar operations, increase the amount of sensibility in the injured parts, without suppressing consciousness in the subject.

["M. Bernard now performs this experiment upon a large frog; and the above-mentioned particulars having been ascertained, he thus proceeds:]—

"When motor nerves have been divided, their excitability diminishes in the first place, but rapidly rises to its former level, and goes beyond it; the experiments which prove this to be the case shall, on a future occasion, be performed in your presence; but, for the time being, it is quite sufficient for our purpose to show that both sensitive and motor nerves momentarily acquire unusual power through this operation, and are in consequence more readily excited by external agents: in this state, medicaments and poisons are also found to operate more speedily upon them; if, for instance, a few drops of a weak solution of strychnia are given to an animal after dividing its spinal cord, convulsions take place in the parts which lie below the wound, but not in those which are situated above it. Professor Fouquier, whose interesting remarks on paraplegia have already been alluded to, had equally noticed this fact; he states that, after administering strychnia in small doses to his patients, he observed convulsions in the lower limbs, the upper extremities remaining, in the mean time, unaffected by the presence of this agent.

"The superabundant activity which follows the division of a nerve progressively increases, till a culminating point has been attained; from this moment it subsides by degrees, and totally disappears at last. When the disorganization of the nervous element has altogether destroyed its usual properties, a similar process begins in the muscles, formerly placed under its influence. The researches of M. Faivre on this point have shown that muscles removed from the body grow more sensible to galvanic action when this stimulant has lost all power on the corresponding nerves. In short, all tissues exhibit a higher degree of activity when deprived of nervous influence; the nerves, in fact, do not befriend in all cases the vital powers, but frequently operate upon them as checks.

The intensity with which the various functions of life are carried on depends, therefore, in a great measure, upon the state of the nervous system: nor is this all; for in animals in which the spinal cord has been divided, we meet with results still more inexplicable, and which approach still closer to the phenomena of disease. The voluntary power of motion having been destroyed by this operation, it seems quite natural to suppose that reflex movements can only be produced by acting upon those parts which lie in communication with the motor nerves, by which the impressions are reflected; that the parts situate above the wound must be excited in order to produce reflex convulsions in the upper extremities, and *vice versa;* but, strange to say, this is not always the case; when this experiment is tried several hours after the spinal axis has been divided, the exaggeration of sensibility below the injured point is such, that violent convulsions are actually provoked in the lower extremities by acting upon the upper limbs! The frog which was placed before you at the commencement of the lecture, and underwent the operation a few days ago, is a proper subject for the demonstration of this property. [The experiment is performed before the class, and succeeds.] We need hardly state that Mammals exhibit these singular phenomena as well as Batracians; but we never meet with similar results when the spinal cord is perfectly sound. According to the notions which prevail upon this subject, the posterior limbs ought not to be set in motion when the parts acted upon do not lie in communication with the corresponding motor nerves: but how, in such cases, is the communication established? Not through the spinal cord, of course; most probably the sympathetic nerve, which remains entire, is the channel through which impressions are then transmitted.

"There exist in the records of Science certain cases which it would be altogether impossible to explain if this hypothesis were rejected. In Magendie's *Journal de Physiologie* we meet with the history of a patient laboring under a disease of the spinal cord, who was, nevertheless, able to walk, although with great difficulty, a few days before he died. On making the autopsy, the spinal cord was found to be completely disorganized, and in a semi-fluid state, on a definite point; a small tract of medullary substance alone remained to connect its two separate portions, nor could this disorder be traced to the usual effects of decomposition, for the remaining parts of the spinal axis were perfectly sound. All communication would therefore seem to have been intercepted between the upper half of the nervous system and the lower extremities; yet we find that the powers of voluntary motion still existed in the patient shortly before death. How is this apparent contradiction to be accounted for?

"The sympathetic nerve obeys the same laws as the cerebro-spinal system, with reference to the augmentation of its powers when it has been divided. When the solar plexus is irritated, no contractions are produced in the locomotive organs in sound animals; but let the nervous system of organic life be placed in a condition similar to that which has just been described, and its excitability increases to such a degree that convulsions are produced over all the body by merely touching the semi-lunar ganglia. These effects are observed, for instance, when the tenth pair has been divided—an operation which exerts a remarkable influence over the sympathetic nerve; the properties which it thus acquires are foreign to all that we know of the physiological states. These phenomena have attracted the notice of a few observers; but much remains to be done in this respect. M. Brown-Séquard, for instance, after having paralyzed the hinder extremities of guinea-pigs by dividing the spinal cord, has succeeded in creating general convulsions in which the paralyzed limbs participate, as well as the sound ones, by merely stopping the air-passages, or otherwise producing asphyxia. The ingenious author of this experiment believes these convulsions to be occasioned by the superabundance of carbonic acid in the blood; but when the animals are allowed to die from hæmorrhage, a similar result is obtained, as I myself have been able to ascertain. Now, in this case, no accumulation of carbonic acid has taken place in the blood; and the respiratory functions do not appear to be connected with these singular manifestations, which must, in all probability, be referred to a peculiar state of the nerves which preside over organic life."—(*Medical Times and Gazette.*)

"*Lecture on Dentition and its Derangements.* By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics New York Medical College.—The belief that the formation and protrusion of teeth are morbid processes, or give rise by their own nature to a large number of diseases, is by no means so old as we are apt to suppose from the general prevailing opinion. Old Hippocrates has a few remarks on the subject, but he cannot, from the few words that are found in his works, be presumed to have cherished the opinions of more modern doctors. For his remarks are, 'In those children who have proceeded to the age in which they get teeth, (*προς δε το οδοντοφυειν προς αγουσιν,*) there will occur a disagreeable itching in the gums, fever, convulsions, and diarrhœa, particularly at the time in which the canine teeth will protrude, and in such children as are very fat and suffer from costiveness.' And he further states as his experience, that 'such as have diarrhœa during dentition will suffer less from convulsions than such as are costive. Such who suffer severely from fever will be less affected with convulsions than those who keep their flesh and weight, and feel inclined to sleep. Such as get their teeth in the course of the winter are better off under equal circumstances. Not all those who have convulsions during dentition will die, but a number will be saved. Those who have a cough during dentition require a long time before they are through, and will emaciate more considerably. Those whose teeth will protrude in the winter suffer less than others.' Nor has Celsus any remarks showing that he considered the process of dentition a disease or a cause of diseases; Galen only, in his commentations on the Aphorisms of Hippocrates, thinks proper to state that diseases may be the result of the irritation produced in the gums by the protruded teeth. This theory has prevailed in the middle ages, both among the profession and the public of all countries, not from its being proved, but only because it was not examined; or rather because medical science and natural philosophy made no progress, or very little indeed, for more than fifteen centuries after the death of Galen and Aristotle. There is, however, a remark in the work of Mercurialis on the diseases of children (1584) which shows that the minds of eminent men will not always be clouded by prejudices though old and general. He states that he cannot help having some doubts, although he feels some hesitation in pronouncing them, as to how dentition could be a disease; as it certainly is as clear to comprehend that nature does not intend nor willingly create disease; and dentition is a 'mere work of nature, that is to say, a physiological process, and for this reason must not be called a disease.' And Heister, in 1753, has the following: 'When symptoms, like pain, crying, sleeplessness, fever, convulsions, and epilepsy, occur, it is sometimes really difficult to learn where they come from, and from what cause, as they will depend on a variety of causes. Therefore all such symptoms must be weighed in your mind with the utmost sagacity, until you are able to say, for certain or with every degree of probability, whether they arise from bad milk or from other causes.'

"There are some names in literature which ought to have the full credit for their endeavors to enlighten the profession on the nature of dentition and its pathological importance or unimportance. I would here mention the names of Wichmann, Sternberg, and Buchheim, and also Brefeld. But in order to understand, against which and how many prejudices they had to battle, it will be necessary to state some of the opinions spread among the profession, in whose minds there was no doubt that the irritation produced by the protrusion of teeth gave rise to diseases. The profession only differed as to the explanation of the locality, nature, and mode of acting of this irritation, and you will find some amusement in comparing different opinions.

"One would assume that there were a large number of nerves in the gums, and an extraordinary irritability resulting therefrom. Another, and an illustrious man too, would take it for granted that a layer of osseous matter, covered moreover with periosteum, would prevent the tooth from protruding from its cavity. The osseous layer was, besides, asserted not to adjoin tightly the circumference of the protruding tooth, which would permit air to enter and irritate the poor dental nerve. In the opinion of others the general irritation in dentition would be the result of the pressure of tooth and alveolus on each other, which is less comprehensive to common sense than any other explanation. Others again presumed that the gums, while retaining the tooth in or repelling it into the alveolar cavity, would exert a pressure on the nerve. One says, incisors give rise to a large number of casualties because they are so sharp and pointed; another, that the protrusion of incisors causes but a small number of casualties *because* they are so sharp and pointed. A third again says, diseases during the protrusion of the incisors are very frequent because some of these and the first molars cut at the same period in which the system is still very feeble and the gum very irritable; a fourth, that they are rarer than at the time of the protrusion of the molars and canines, because the gums are softer and all the fibres more tender. One declares that the protrusion of the incisors is not so dangerous because their point is sharp; the other, that the canine teeth are very troublesome, because again, their point is sharp; and a third, because it is not *quite* sharp. The same canine teeth prove very dangerous, in the opinion of one, because they grow very slowly; of another, because they protrude so fast—faster than the molar teeth, which cut with a broader surface but more slowly and gradually. At last another comes, telling you that molar teeth are very dangerous, because of this very broad surface penetrating the gum. But more dangerous than any of the molars or incisors are the canine, in the opinion of another busy expounder, because in its protrusion it is hemmed in by an incisor on one, and a molar tooth on the other side. There comes, then, a profound anatomist who discovers that there are folds along the upper margin of the gum which, when normally developed, will prevent any disorders and serious diseases; but the norm appears to be that their development is thoroughly abnormous—and that diseases during and in consequence of dentition are commonly found. A neuropathologist considers a cutaneous spasm to be the common cause of all the troubles; another denies the sensibility of the gums, but thinks proper to attribute to it a large amount of irritability. A follower of humoral pathology seeks for the cause of all the evils in the increased quantity and poisonous condition of the saliva; another in the suppression of the secretion of the salivary glands; a third, and one of the best names too, Hufeland, in the fever which is said to be absolutely required for the regular and normal progress of dentition. And at last a celebrated author also goes so far as to deny the existence of local influences in the gums to produce general diseases, but attributes them to the fact that during the protracted period in which teeth protrude, the general development of a large number of organs takes place contemporaneously, and that dentition disturbs its regular progress.

"These and other opinions have been expressed, and warmly defended, as the origin of all those numerous, or rather numberless diseases of dentition. Buchheim, in an elaborate article published forty years ago, has, by ransacking the literature of the last, and the first twenty years of this century, collected these and more theories of a similar kind, and exhibited an unusually interesting picture of contradictions and arbitrary assertions. I have abstained from giving the names of the authors of such theories as have been brought before you; but I have thought it just as well done to omit them, not considering these theories to entitle their inventors to immortality. Such as have no other claim to immortal fame will soon be forgotten, and some of them have been forgotten already with the single exception of their names.

"I was just about closing up the exhibition of these more or less queer, comic, or astonishing opinions concerning the cause of the numerous supposed diseases of dentition, when I remembered the great physiologist, pathologist, and public benefactor, M. Delabarre, of Paris. He has at last dissolved the gordian knot of that much tormented question all at once. What of inflammation of the pulp? he exclaims; what of compression of the periosteum, injured nerves, tension and rupture of the gums, and all other assumed causes of the diseases of dentition? Why is it, he asks triumphantly, that one-sixth of all the deaths in infantile age occur from dentition? I have found it! Do you not see that before and during the protrusion of teeth the child brings its fingers to the gums? Would a child do so when or because it has pain in the gums? Certainly not; for if it had pain it would carefully avoid touching and pressure. Therefore, 'que serait-ce, sinon une sensation de prurit, de denangeaison, de chatouillement?' What could it be, pain being out of the question, that induces the child to bring its fingers to its mouth? Why, a sensation of pruritus or tickling. Now this pruritus of dentition will not be found, or not considerably, in normal cases of dentition; but in children with bad nutrition it is perfectly intolerable, and gives rise to the perturbation of all vital functions, sleeplessness, loss of appetite, dyspepsia, fever, diarrhœa, vomiting, and convulsions. Nor does the author of this ingenious theory pretend to say that all the children are equally subject to this dentition pruritus. Not at all. Those suffer most who are most ticklish.

"If, perhaps, you cannot understand the logic of these assertions, their author will probably consider you incompetent. He may be right, as long as you do not know all the attending circumstances. The reason why this theory was invented is this, that M. Delabarre invented at the same time his dentition syrup, which is destined to cure the dentition pruritus, and thus to save a million of infants a year. It is but just to say that M. Delabarre knows more of this syrup than anybody else, as he has taken particular pains not to divulge its composition, but to prepare and sell it himself. Thus you have the wonderful sight of the powerful mind of a single ingenious man, discovering two important things contemporaneously: viz., a morbid condition, or a disease, which is the cause of a legion of others, and besides, the infallible remedy. Which of the two he has discovered, or invented, first, 'deponent saith not.'"—(*Amer. Med. Times.*)

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"*On a Previously Unobserved Preventable Cause of Idiocy, Imbecility, and the Allied Affections.* By MR. THOMAS BALLARD.—The deplorable condition, idiocy, is neither limited to locality nor to any rank of society. The two most recent writers on the subject, Dr. Howe, of Massachusetts, and Dr. Morel, of Rouen, attribute it to certain defects, either moral or physical, on the part of the parents; but neither of these theories, nor the more popular one of intermarriage with near relations, seems to afford a satisfactory explanation of its production. Dr. Guggenbühl, whose experience at the Abendberg is said to have rendered him the greatest existing authority on the subject, has stated the result of his observations to be 'that the debased mental and physical condition termed cretinism consists in an affection of the cerebro-spinal system—most probably cerebral œdema; and is associated with rickets, hydrocephalus, and other scrofulous manifestations.' He denies the hereditary tendency to it, and regards it as exclusively a local phenomenon fostered by certain exciting causes which are in operation during the first three years of life. Dr. Guggenbühl seems not to have ascertained what these causes are. The author had arrived at similar conclusions respecting the interdependence of these various morbid phenomena; the object of the present communication being to direct attention to the cause which he believes to be principally engaged in producing them. In a work which he had recently published, entitled 'A New and Rational Explanation of the Diseases peculiar to Infants and Mothers,' it was shown that 'the exercise of the instinctive act of sucking under circumstances unfavorable to the infant obtaining food is a principal source of disease to infants and puerperal women;' the result of this fruitless sucking being an excessive reflex secretion of gastric and intestinal juices, which corrode and soften the mucous coat of the intestinal canal, thus severely injuring the digestive powers, and consequently preventing the proper growth and nutrition of the various tissues of the body. The frequent and green stools which sucking infants so frequently are the subjects of are the evidence of this process of injury to the intestinal canal being in operation. And thus fruitless sucking becomes the chief cause of the developmental diseases of infants and children, and especially of the very pathological conditions which Dr. Guggenbühl has observed to be associated with cretinism. The author has observed that idiocy is a condition involving many of these morbid phenomena. The histories of all the cases are similar. They have suffered in infancy persistent diarrhœa, succeeded by fits or some form of convulsive disease. A large majority of them bear evidence of long-continued habits of fruitless sucking in the deformity of the jaws, which is caused by some portion of the hand being placed in the mouth for the purpose of sucking it at a period of life when the bones were soft enough to yield to its pressure. The upper jaw is either forced forward, thus causing the upper teeth to project; or the lower jaw is drawn forward in advance of the upper, constituting the deformity known as 'underhung.' Sometimes the jaws are not deformed, yet the condition of idiocy is extreme: in such cases either the whole mischief has occurred very early in life, so as to blight the growth of the brain, thus producing an idiot with a small head; or the habit of fruitless sucking has been continued under the form of 'tongue-sucking.' These latter cases add much weight to the present explanation, because the effect upon the intestinal canal is still maintained, the subjects of it having loose evacuations from the bowels, particularly during the night, and the habit being especially practiced when in bed. They constitute many of the 'dirty patients' in asylums. In addition to the deformity of the jaws, the defective condition of the incisor teeth is another evidence of fruitless sucking stamped upon the idiot; it results from the irritation to which the corresponding portion of the mucous membrane of the mouth is subjected during their development. The sources of fruitless sucking to which infants are very freely subjected, and from which the retained habits above mentioned are acquired, are three in number, namely: 1. The mother's breast, when it does not yield as much milk as the infant requires. 2. The 'sugar-teat,' which is frequently placed in the child's mouth by the nurse, to keep it quiet. This is probably much practiced on the Continent, where idiocy is very common. 3. The prevalent custom of feeding infants through artificial teats, which collapse under the pressure which is necessarily exercised upon them in the act of sucking. The author then repeated his conviction that the various forms of convulsive disorders of infants are not dependent upon eccentric causes, such as teething and worms, but that they are really the evidence of cerebral disease, in all probability some degree of œdema, giving rise to congestion and pressure; and that their treatment by hot baths, emetics, purgatives, lancing the gums, etc., is not the most conducive to a perfect recovery. * * * The fundamental and most important point is to direct the attention of parents to the *mode* of administration of food. The kind of food best adapted for infants is sufficiently obvious. If the infant can obtain its food without excessive sucking, it is not subject to diarrhœa, growth and development progress properly, fits and convulsions do not occur, and habits of fruitless sucking are not acquired. The author believes that if this point could be generally understood, not only would the Registrar-General's reports show a great diminution of infantile mortality, but the physical and mental development of future generations would be much improved. Some plaster models of mouths were exhibited to illustrate the deformities alluded to; and twenty cases bearing on the various points touched upon in the paper were given in detail.

"Dr. Down would make a few remarks based on the daily observation of the care of several hundreds of idiots. If he were asked if sucking the thumb was characteristic of the habits of idiocy, he should say certainly not. It was of course common among idiotic infants, but not more common than in other infants. About a fortnight ago, two brothers, who were idiotic, were placed under his care. There was another child of the same family, who was quite healthy. One of the idiots sucked his thumb, as did the healthy child, the other idiotic child did not. The eldest of the idiots, the one who sucked his thumb, died a few days ago. In this case, the autopsy showed that there was sufficient organic disease to account for the idiocy. There was deficiency of the corpus callosum and fornix, which, without any other theory, was sufficient to account for the idiocy. Another fact bearing on this subject had recently come under his observation. A mother of twelve children had taught all of them to suck their thumbs. The twelfth was idiotic, but all the others were quite healthy. In reference to the malformations of the jaws, he believed most of them were congenital, and were to be placed in the same category as hare-lip and cleft palate.

"The President remarked that he could scarcely attribute such grave effects to sucking the thumb as the author of the paper appeared to do.

"Dr. Tanner remarked that every one must have noticed that nine out of ten children sucked their thumbs. He certainly had never advised parents to check the habit, for he had never seen it productive of any mischief. He did not clearly understand from the paper whether Dr. Guggenbühl attributed cretinism to fruitless sucking. He (Dr. Tanner) considered that the convulsive and cerebral symptoms alluded to by the author, were due to eccentric irritation. He was surprised that the author would not admit this as a cause of such symptoms. Surely he must have seen cases in which the expulsion of worms was followed by immediate cessation of convulsions. It was a matter of almost daily experience, that convulsions would cease after lancing the gums, when the latter were indurated and inflamed, and were obstructing the exit of the teeth.

"Dr. Little considered that Dr. Down had given very clear evidence that we must look for idiocy generally in some organic defect, probably congenital, in the brain. He (Dr. Little) believed that fruitless sucking would produce inanition, but simply because it was fruitless, because no nourishment was obtained, and that from this inanition certain cerebral symptoms might ensue. He considered that there had recently been a great improvement in the treatment of the cerebral affections of children. It was at one time too much a matter of routine to attack head symptoms by leeches, bleeding from the jugular, and by the administration of mercury. He would not say that even now the use of antiphlogistic remedies was not sometimes judicious practice, but the majority of cases required almost opposite treatment.

"The author considered that Dr. Down had misunderstood some parts of his paper. He did not expect that the three hundred idiots under Dr. Down's care would pass their time in sucking their thumbs, nor did he consider that fruitless sucking was a direct cause of disease of the brain, but secondarily, by producing inanition, by diarrhœa, etc. He would ask Dr. Down if the deformity of the jaws—he did not mean cleft palate or hare-lip—was not due to sucking, to what was it due? He (the author) considered that the investigations of Dr. Guggenbühl and himself led to the conclusions he had submitted to the society. He maintained that the cerebral defects were more likely to be due to the causes he had mentioned than to reflex irritation from teething, worms, etc."—*Extract from Proceedings of Royal Medical and Chirurgical Society.* (*Med. Times and Gazette.*)

"*On the Means of Estimating the Value of Gilded and Silvered Articles.*—The following methods have been employed, for some time past, in the German revenue offices, for testing the value of gilding and silvering, and may be of interest to our readers from the circumstance that it is often of importance to have a test by which real silver plating on articles manufactured from similarly-colored metals, *e.g.* German silver and Britannia metal, may be distinguished from those which, to give them a better appearance, are only slightly silvered. The thin coating of silver on this latter class of goods is, of course, soon rubbed off, and then the real color of the metal becomes apparent.

"The value of a test of this kind consists in its easy execution, and the certainty of its indications.

"TESTING OF GOLD.—The ordinary method of testing gold by the touchstone is founded upon the insolubility of this metal in nitric acid. If a mark be made on the touchstone with the article under examination, the gold is not dissolved by this acid, whereas golden-colored alloys of inferior value are dissolved and disappear immediately.

"When articles are very thinly gilded, the detection of the gold in this manner is uncertain, in which case the following method may be used with advantage. This process depends upon the fact that an aqueous solution of chloride of copper is without action on gold, whereas on golden-colored alloys, as brass, pinchbeck, etc., it produces a black spot. The testing fluid prepared by Loewe's prescription, by dissolving copper in fuming nitric acid and adding a solution of common salt, does not give very certain results, for if the article be but slightly gilded a black spot is nevertheless produced. The concentration of the testing fluid, for instance, exerts a very important influence; for a strong solution of chloride of copper will blacken, although a more dilute form of the same is a reliable test. In order to exclude all traces of aqua regia formed by the action of the nitric acid on the common salt, and which easily dissolves traces of gold, the testing fluid is recommended to be made in the following manner:—

"A little carbonate of copper is put into a test-tube, and to this is added, drop by drop, pure hydrochloric acid till the blue powder has dissolved to a clear green fluid, occasionally warming it over a spirit-lamp. This concentrated solution of chloride of copper is diluted for use with from ten to eleven times its volume of distilled water. Before testing, the metallic surface must be well cleaned. This can be done effectually by brushing it for a minute or two with a little spirits of wine, or better, with absolute alcohol.

"The surface having dried, a little of the testing fluid is dropped on and allowed to remain in contact for about a minute. The fluid is then removed by means of a small pipette, and the surface of the metal completely dried with bibulous paper; if no dark spot be then visible, the article is coated with pure gold. If the metallic surface is but lightly gilded, a very slight blackening is sometimes remarked, which may throw a doubt upon the result. In such a case, to make quite certain, a little of the surface may be scraped off, and then the testing fluid again applied. If a dark spot is then perceived, the article may be considered as very thinly gilded.

"If a further and more direct proof of the presence of gold is required, the article to be examined, or a piece of it, may be put into a porcelain cup, and as much pure nitric acid poured over as will half cover it. The thin layer of gold covering the surface does not prevent the metal from being attacked by the acid, and the gold becoming separated floats in thin films on the top of the liquid. The green metallic solution is now removed, and more nitric acid poured over the gold spangles: it is then somewhat warmed, and water finally added. The gold has now been fully tested by its insolubility in nitric acid, and it only remains to ascertain that it dissolves to a yellow solution in warm aqua regia.

"Thin gilding of this description is often met with in the French mock jewelry; the coating is sometimes so thin that it not only deceives the eye, but is difficult to test by the ordinary methods. Instead of putting the entire article into the acid, and thus risking its demolition, a portion of the surface may be scraped off with a knife, and tested with the nitric acid.

"When an article appears to be made of massive gold, the testing by means of the touchstone should be first resorted to.

"TESTING OF SILVER.—The ordinary and very accurate method of testing silver is founded upon the insolubility of chloride of silver in dilute acids and in water. This otherwise satisfactory test is, however, difficult to carry out when an article is very thinly plated with silver; but in all these cases a simple and very accurate test can be used, which is based upon the reaction of chromic acid upon metallic silver. For this purpose a testing fluid is prepared by adding pure nitric acid to powdered red chromate of potash, and mixing them in such a manner that a part of the latter remains in suspension, the whole being kept well stirred during the mixing. Equal parts by weight of each may be taken. The nitric must be quite free from hydrochloric acid, and have the proper degree of concentration, being neither too fuming nor too dilute; it should have a specific gravity between 1·20 and 1·25. When the mixture has been prepared for a few hours, and been stirred several times, the reddish-colored liquid is poured off from the residue and kept in a stoppered bottle. A drop of this liquid is then brought in contact with the metal to be tested, and immediately washed off again with water. If a visible blood-red spot remains, silver is present.

"This method requires only the following precautions: Firstly, the metallic surface must have been quite cleansed from grease or varnish with spirits of wine; secondly, water must be poured over the treated surface before judging of the color, as that of the testing fluid is altered by the metal, and the red precipitate is not distinctly visible until the colored liquid has been washed off. The red spot can afterward be very easily removed with the finger.

"By this method the slightest trace of silver in an alloy may be ascertained. When an article is suspected to be only thinly plated, a very minute drop of the testing fluid should be used. With no other metal or alloy does this red spot, so characteristic of silver, appear; in some cases the testing fluid only corrodes the surface of the metal, while in others colored precipitates are formed, which, however, cannot be confounded with those of silver.

"German silver brought into contact with the testing fluid affords no red spot after being washed. The spot will, however, have been strongly corroded.

"Britannia metal yields a black spot; zinc is strongly corroded; platinum is not attacked; lead gives a yellow precipitate; tin is strongly affected by the fluid; when the brownish-colored testing fluid is washed off, a yellow precipitate is perceived, which adheres tightly to the metal; copper is strongly attacked—a tarnished surface of this metal is brightened by the action of the acid. Bismuth yields a yellow precipitate; antimony does not; by this means, therefore, these two metals, somewhat similar in many respects, can easily be distinguished. Mercury, or an amalgamated surface, yields a reddish-brown precipitate, which, however, is entirely washed away by the water, and is not likely to be confounded with the silver reaction."—(*Deutscher Ingenieure*, and *Chem. News.*)

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Comparative Anatomy.—The following interesting remarks, on the dental branch of this subject, occur in an elaborate paper on "Equatorial Africa and its Inhabitants" in the *Westminster Review* for July of this year: "The nasal bones in many negro skulls do not form a saddle-shaped projection as in European skulls generally, but lie almost in a plane, thus approaching to the lower forms. Sœmmering has observed a fissure or slightly traced suture separating the incisor from the laniary teeth; this proves the separate existence and late anchylosis of the intermaxillary bone, as in apes. The proportionate size of the bones of the face in negroes, according to Blumenbach and Sœmmering, compared with those containing the brain, is greater than in Europeans, and is, so far, an approach to the ape. The conformation of the teeth in the inferior varieties of man presents some curious approximations to the dental structure of the ape. In the latter, the premolars, or bicuspids, are implanted by three fangs; in the Caucasian race of man they generally have, seemingly, only one fang, which, however, consists of two more or less completely united; but in negroes these teeth have two distinct fangs. 'It is only in the black varieties,' says Professor Owen, in his admirable paper on the teeth, 'and more particularly that race inhabiting Australia, that I have found the wisdom tooth with three fangs as a general rule; and the two outer ones are more or less confluent.' In most of the black varieties of man, especially the Australians, 'the true molars attain larger dimensions than in the yellow or white races;' and, as well as in the apes, are supported by two distinct fangs; whereas 'in the white and yellow races of the human subject these fangs are not unfrequently united in the second molar, and are usually so in the third.' Just in proportion as the teeth of the black races diverge from the Caucasian form, they approach, it will be observed, the dental organization of the apes."

Tobacco.—In some observations on the effects of this agent upon the animal economy in the *Anti-Tobacco Jour.*, DR. JOHN C. WARREN makes the following remarks in relation to its deleterious action upon the tissues of the mouth: "Tobacco is by some persons recommended as beneficial to the teeth; but, while it can have no material effect in preserving the bony substance of the teeth, it has a real influence on their vitality by impairing the healthy action of the gums. These, and also the adjacent parts, are very subject to cancer, particularly the tongue and lips. For more than thirty years I have been in the habit of inquiring of patients, who came to me with cancers of these parts, whether they used tobacco; and, if so, whether by chewing or smoking. If they have sometimes answered in the negative as to the first question, I can truly say that, to the best of my knowledge and belief, such cases are exceptions to the general rule. When, as is usually the case, one side of the tongue is affected with ulcerated cancer, it arises from the habitual retention of the tobacco in contact with this part. The irritation from a cigar, or even from a tobacco-pipe, frequently precedes cancer of the lip. The lower lip is more commonly affected by cancer than the upper, in consequence of the irritation produced on this part by acrid substances from the mouth. What is more likely to cause a morbid irritation, terminating in disease, than the frequent application of tobacco-juice? The want of attention to cleanliness often connected with this practice, and the consequent lodgement of the particles of tobacco on the surface of the lip, has a great influence in these cases.

"Aged persons are very liable to cancer, especially about the face; and, when an irritating substance is applied habitually, the skin becomes disordered, and takes on a cancerous action. This irritation may be produced by the use of tobacco in the interior of the mouth, by the habitual application of a cigar to the lips, and even by a pipe applied to the same parts. Few days pass without my having an opportunity of witnessing the verification of these facts."

"*The Physiology of Bone.*—The physiology of bone, its development and pathological changes, have been recently the subjects of very important researches. The highly-interesting experiments of M. Ollier have shown how great is the ossific power of the periosteum, and under what remarkable conditions of severance and transplantation it retains that power. On the other hand, a unique specimen presented to the Pathological Society, this year, demonstrated that in the case of the lower jaw the growth of the bone depended on the presence of the articular cartilage so far as the perpendicular ramus was concerned, and on the teeth for the horizontal part of the bone. This specimen fully confirmed the views expressed thus far by Kölliker and Tomes. Its minute description and the deductions which may be drawn from it will be looked for with interest in the next volume of the 'Pathological Transactions.' Dr. Milne Edwards, that able Englishman who has done so much for the scientific glory of his adopted country, France, has recently communicated to the Academy of Sciences of Paris a series of ingeniously-devised experiments destined to ascertain the nature of the nutritive materials required for the development of bone. Chopart had already shown that when the quantity of mineral substances naturally retained in food is withheld, the bones become thin and brittle, the general health is impaired, and death soon follows. Dr. Milne Edwards endeavored to discover whether the osseous tissue is thus destroyed by the blood's reabsorbing the calcareous matter or by other means. He finds that under these circumstances the composition of the osseous tissue remains unchanged, although the whole bone wastes; so that it is not the lime alone, but the whole bony substance which undergoes reabsorption. Dr. Milne Edwards also endeavored to substitute the carbonates of iron, manganese, and magnesia respectively for that of lime in the bones by an artificial diet. This diet having reduced the pigeons subjected to experiment to utter emaciation, they were killed: the bones were extremely brittle and thin, but only traces of magnesia and iron were discovered in two, and none in the third. So that the composition of bone does not appear susceptible of alteration by substitution; and Dr. Milne Edwards concludes that bone is a compound of two primordial substances—namely, phosphate of lime and osseine—the immediate principle of bone. Rather a lame conclusion this, after all!"—(*Lancet.*)

Innodular Calcification.—In the course of one of a series of very interesting articles on osseous tumors of the mouth, in the *Med. and Surg. Reporter*, Dr. Jas. E. Garretson relates the following instructive case of this affection: "During the last session of the University, a student in the medical department applied to me, suffering from neuralgia so severe as to have entirely incapacitated him for study for a period of some three weeks. During this time he had tried all the ordinary remedies which had suggested themselves, without finding the slightest relief. The pain varied between the tuberosity of the superior maxillary and the ear. The teeth, about the tuberosity, were as sound and healthy looking as any I have ever seen; there was apparently, no local lesion, while, on the other hand, the physique of the gentleman was not at all of the neuralgic type. I was perfectly at sea with the case, until after a day or two there came to my mind an instance of innodular calcification of the dental pulp. I had once seen, at that time the only case, where the patient had suffered in about a like manner. Now I did not judge, of course, that of a certainty I had differentially discovered the source of trouble, but still I felt so well satisfied, that I requested and obtained the consent of the patient to be allowed to drill into the pulp chamber of the wisdom tooth of the painful tuberosity. The result was the finding of the pulp filled with osseous granules—granules of osteo-dentine. The extraction of the tooth was followed by the immediate cessation of all pain, and the gentleman was able to go from my office direct to lectures."

"*Salivary Fistula.* By R. G. H. BUTCHER, Esq., Dublin.—[The following short abstract shows well the mode of dealing with cases of salivary fistula. The case was one of removal of the whole upper jaw and malar bone, for the extirpation of an enormous tumor.] On the seventh April, I opened a small abscess in the parotid region, or rather in front, over the masseter muscle. From this flowed out pus and saliva in abundance, the latter fluid continuing for some days to drain freely from it. I passed an armed probe with a few threads of silk from the external opening, through the abscess, forward into the mouth, and tied the seton up; and in a few days, having established a channel for the saliva into the mouth, I pared the edges of the external wound, brought them together, maintained them so by two points of twisted suture, using very fine needles, and in three days the wound was healed and closed permanently, and the saliva continued to pass by the artificial canal into the mouth."—(*Dublin Quarterly Journal*, and *Braith. Ret.*)

MISCELLANY.

One of the primary indications in the treatment of the disorders of the higher and more complex organisms, as of man for instance, is to overcome the irritability of the nervous system. This may be effected either by general or local, direct or indirect narcosis, according to the extent, character, and degree of abnormal action. In the course of one of his valuable lectures "On Pain and the Therapeutic Influence of Rest," in the *Lancet*, MR. JOHN HILTON gives the following illustration of the good effects of this practice: "If we can, by introducing opium into the auditory canal, relieve toothache and a stiff jaw, do we not come to the same principle as that which stands before us in respect to the circumflex nerve and its cutaneous filaments? Last winter, during that very cold weather with sharp easterly winds, a gentlemen called on me, and told me that while riding on horseback that morning down Highgate-hill, he was suddenly seized with stiff jaw and intense pain in his left ear, and he added, 'I have been to my office, but in consequence of the pain in my ear I cannot do anything. I have endeavored to overcome the pain by sitting quietly in my warm office; but I cannot bear myself, and now I have the most exquisite sensitiveness and pain in the left ear, and I can hardly move my jaw.' In order to relieve him, I employed the principle of physiological rest, which I have been advocating to-day. By my direction he introduced some cotton wool, soaked in sedative solution of opium, into the auditory canal. As he had a good deal of throbbing pulsation in the head, and imaginary noises in the ear, I thought it would be as well to give him a calomel pill at night, and a purge in the morning, and I requested him to let me see him on the following day. When I saw him in the morning, he said, 'I am much obliged to you for the medicine, but I have not taken it; for I had not put the opium into the passage of the ear a quarter of an hour before all my symptoms disappeared, and the jaw became free from pain and stiffness.' I think, then, we may fairly deduce from this and like cases, that if we can relieve muscular spasm of the jaw by putting anæsthetics upon a cutaneous branch of the same fifth nerve which supplies those muscles, we may employ, with great advantage, the same kind of remedies in joint diseases, in the expectation of deriving great benefit to the joint, by acting upon the cutaneous nerves of the same trunks which supply those muscles that are doing great harm to the joint, by spasmodically moving it, or by pressing the inflamed articular surfaces upon each other."

In a resumé of some observations "On certain of the Phenomena of Life," in the *Half-Yearly Abstract of Med. Sci.* for July, it is stated that "on the point of nerve-force, or electro-nerve-force, Dr. Richardson advanced a view differing materially from that which is generally received. He taught that the special force resident in the nervous system is not generated specially in the ganglia or centres, but everywhere where there is nerve; that this force does not travel from the centres to the periphery, either in intermittent or continuous current, but exists, wherever there is nerve supplied by blood, in a state of equilibrium; and, lastly, that every impression made on the nervous system, and so on the brain, is not by a nerve acting as a specific conductor, but by a disturbance in the equilibrium of the nerve-fluid altogether. This nerve-force or fluid, at the instance of the will or of impressions made on it from the external world, exerts a counter-influence in the muscular fibre to that which may be called the force of the muscle itself, or the force which holds the muscle in a state of passive elongation. Under this counter-influence the diameter of the fibre is changed from the long to the transverse, so that, without losing in bulk, the muscle contracts and shortens."

Among the striking phenomena presented in the development of the animal organism is the evolution of the teeth, yet strange as it may seem, this process of dentition has been regarded as abnormal when in reality it is as essentially normal as gestation, parturition, digestion, circulation, innervation, or any other physiological act. The inconsistency of the view, therefore, which presents it as a disorder is so very obvious, that it should be entirely discarded, and, we are glad to see, has been thus treated in an article in another part of this number, and also in some remarks upon the subject in the *Med. and Surg. Reporter*, from which the following is an extract: "We have always supposed dentition or 'teething' to be a normal physiological process; a process by which nature prepares the system of the infant for the change its growing wants demand; for the mastication of its food when its maternal supply is cut off. True, irregularity and derangement of the digestive organs and nervous system may and do arise in its progress. Diarrhœa and vomiting, severe and persistent, are almost invariably attendant upon it. Convulsions sometimes occur. How many of these little innocent beings are allowed to suffer for weeks under this complication of difficulties—which are the *real disease*—even until their emaciated forms, sunken eyes, and wrinkled skin indicate that vitality is nearly exhausted, under the idea that 'it's only teething,' 'teething will have its run,' 'some children get teeth easy, and some hard,' 'must have diarrhœa and vomiting,' ''twont do to stop 'em,' ''twould strike to the head,' '*it's only teething.*'"

Among the curiosities of pathology, is the formation of stone in the bladder by the deposit of certain sedimentary substances upon bodies entirely foreign to that viscus, as in the case of teeth, bone, hair, etc., an instance of which is given in the following from M. CIVIALE's clinical experience for the past year (*Ibid.*) "The third woman, an account of whom I have published, presented one of those extraordinary cases which one meets with at distant intervals. The stone, a phosphatic one, was formed upon a mass of teeth, of little bones, and of hair, arising from a hair-cyst which had opened upon the bladder. All these bodies and the stone itself were successfully extracted by lithotrity."

In the report of the proceedings of the Pathological Society of London, (*Med. Times and Gaz.*,) it is mentioned that "MR. BALLARD showed some casts from cases of deformed jaws, to illustrate the influence of the long-continued habit of sucking the thumb, in altering the position of the teeth and the form of the jaws. The casts showed the lower teeth pushed inward, and the upper ones outward, the arch of the palate being unusually high. * * The President stated his conviction that the subject was an important one, and well deserving the attention of the profession. He agreed with Mr. Ballard in thinking that the habit of 'fruitless sucking' was very injurious to the health of children, and one which medical men should warn parents against permitting."

MR. JOHN MARSHALL gives the following description of the denture of a young chimpanzee, in a paper on the brain of that animal, in the *Natural History Review* for July, 1861: "The temporary teeth were all present, much discolored, and much worn, but not even the incisors were loose. In the lower jaw, the first permanent molar was well through the gum on the left side, but that tooth was still partially covered on the right; the corresponding teeth of the upper jaw were still beneath the swollen gum; so that, whatever the fact may be worth, the same lateness of eruption of the upper teeth in comparison with the lower, as is observed in man, obtained in this animal."

In the report of the proceedings of the Med.-Chir. Soc. of Edinburgh, (*Dublin Med. Press*,) it is stated that "Dr. Roberts showed specimens of the so-called caustic nut, which had been sent to him by a gentleman in India. The action of this nut was not unlike that of nitrate of silver, and it stained the skin in the same manner. A friend of Dr. Roberts who was suffering from toothache had cut off a piece of a nut, and applied it to the tooth. For half an hour the pain was intense, but it then ceased, and had not returned."

The *Amer. Druggists' Circ.* says that "vulcanized caoutchouc-tubes for connecting chemical apparatus are freed from the sulphur on its surface by boiling in a solution of caustic potash. De Luca has shown that in the preparation of *iron by hydrogen*, if the gas apparatus has the ordinary tube-connections, the product would never be free from sulphur."

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The Physician's Visiting List, Diary, and Book of Engagements for 1862. Philadelphia, Lindsay & Blakiston. This is one of those convenient pocket-manuals now so generally employed by physicians as a professional register; and though not quite so elaborate as some other publications of the kind, it is well adapted for the purposes designed.

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, OCTOBER, 1861. No. 3.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

We gave a few cases, in the August number of the Dental Cosmos, of preparing teeth for extraction, by making applications to the gums. We wish now to call attention to extracting teeth, when it is necessary to cut away the bone. In some cases, it is better to cut the bone away, than to separate the fangs of a tooth by cutting forceps. To split a tooth to extract it, is a shocking process, and a necessity for it very seldom arises. We were operating, a few days since, for a young lady from a neighboring town; her mother accompanied her, and while sitting by, she remarked that she was losing all her teeth, as she could not make up her mind to get anything more done to them, she had suffered so much twenty years before in getting one extracted. The dentist had occupied two hours and a half in removing it! He first split it into three pieces—it was a right superior molar—drilled a hole in each root, and removed them with a screw; when she got home, she was confined to her bed for a week. She could not have anything done to her teeth since, but she would take good care of her children's, that they might not have the same terrible ordeal to go through with. It may suit some dentists to go through with such a process to extract a tooth. We tried it in a few cases in our early practice, but we have abandoned it as among the operations of barbarous times. If such cases ever occur to a dentist, they are a great misfortune to him; he may feel that he is doing his duty, but their effects upon his patient remain for life. He should exercise his talent in some way to avoid such results, or be sure that his patients realize the necessity.

In preparing teeth for extraction, where it is necessary to cut the bone away, it is not as difficult as might at first be expected, although there are cases where the bone is too thick and too hard, and the patient unduly sensitive. There can scarcely be any rule laid down for extracting teeth in difficult cases, except the rule that governs each case, and this requires the exercise of the judgment of the operator, and is a thing which can hardly be put on paper; the nearest approach to it is the history in detail of cases as they occur in practice. It is a little like the law, as it was described to us by a learned attorney-general. It was the correct history of evidence given in cases, and the decisions of learned jurists that constituted authority.

Case.—A gentleman, about thirty years of age, a doctor by education, from a distant city, called on us, some time since, suffering intensely from pain caused by periosteal inflammation of the superior first molar, right side. It had been broken off level with the alveolus in an attempt at extraction about one month previous. We opened the roots as well as possible to let out anything which might have accumulated at the ends of the roots, hoping that would be sufficient to relieve the case, as the same treatment had often been successful in what seemed to have been similar cases; but not so, the patient returned in a few hours, suffering so severely that he remarked, "The tooth must be extracted, if it takes the head off down to the shoulders." Three gentlemen accompanied him. We went about the work as deliberately as possible. We slit down the bone and the gum, following the direction of the fangs about two-thirds of their depth with a strong and sharp double-edged lancet. (The figure on the margin represents it.) One edge holds the lancet on the ridge of the root, and the other, turned a little outward, divides the bone and the gum. When this part of the operation is done, the lancet is turned flatwise against the buccal roots, and pressed downward between them and the outer wall of the socket, cutting it away from the process of bone which occupies the space between the three roots; this creates an opening which admits of the tooth being removed out of its socket, in the direction of the cheek. A small, straight-beaked forceps was now applied, and the tooth removed with ease and with but little pain. Some idea may be formed of the formidable character of the case, by referring to the accompanying drawings, which are correct from nature. Buccal view, *fig.* 1, anterior view, *fig.* 2. It will be seen that in two directions these roots diverge so as to be nearly one-quarter of an inch wider at their extremities than the diameter of the neck of the tooth. When the gum and bone are cut down half way to the ends of the roots on the buccal side, and the tooth removed in that direction, the divergence of the palatine root does not militate against the operation, as the sweep of the tooth outward corresponds to the direction of this root, and the operation viewed in this light is a very easy one.

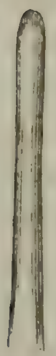


Fig. 1.

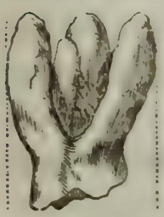
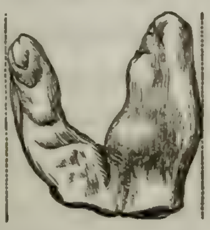


Fig. 2.



REVIEW OF "PRACTICAL HINTS."

BY ABR. ROBERTSON, D.D.S., M.D.

It is always a matter of regret to find myself unable to agree, either in practice or in theory, with the learned senior editor of the Dental Cosmos. But, as "we," like him, "have often" felt, if not "expressed surprise that there should be so much difference of opinion about the various modes of practice in a demonstrative science like ours; nevertheless we feel it a duty to continue to write and communicate what we consider successful practice, even if it be objected to by those whose opinions we respect."

And like him, further, "we never have, nor is it our intention to set up an argument against any one's practice" for the sake of argument, or if we do not honestly consider such practice, or rather such instruction, wrong; but, "we write more to expose our own for the benefit of learners in our art, believing there are many in it, like ourselves, needing all the hints and instruction they can obtain from every source." And, "as iron sharpeneth iron, so a man sharpeneth the countenance of his friend," I think it is sometimes well, not only to review our own modes of practice, but also to have them reviewed by others. I therefore address myself to a rather cursory review of the "Practical Hints" in the August number of the Dental Cosmos.

And, to commence at the beginning, if I may be pardoned the freedom, I must say that I think the article, instead of being headed "Practical Hints," should have been headed *im*practical hints.

Let us examine a little and see.

It would indeed be "strange that when we advocate the practice of lancing the gums to lessen the pain, and render the operation of extracting teeth more certain, we should be charged with inducing unnecessary suffering—the very thing which it is our aim to avoid," if the indiscriminate or the general practice of lancing the gums produced any such results, or if any satisfactory arguments were adduced to show that it produced those effects. But that lancing the gums, except in rare cases, does lessen the pain or facilitate the operation of extraction, I have as yet failed to observe in practice, or to see any argument to prove. Neither have I seen, from the pen of any one who opposes the general practice of lancing the gums, an article denying its necessity in some cases.

In my own article on that subject, in the August number of the Dental Cosmos, copied from the July number of the *New York Dental Journal*, I distinctly state, "this, in some cases, is an important preliminary operation, and, when required, should be done well and thoroughly."

"The cases which require the operation are the roots of such teeth as are decayed or broken off so far below the gums and the edge of the alveolus, that they cannot be seized or apprehended by the forceps or other instruments to be used for their removal, without cutting or otherwise injuring the gums; or such roots of teeth as from inflammation or otherwise have the gums more or less closed over them, *rendering it difficult to apply any instrument without first removing the gum, or, at least, not without inflicting a great deal more pain with the extracting instrument than with the knife.*"

A view essentially different from this I have never seen advanced by any one who opposes, ever so strenuously, the indiscriminate use of the gum lancet.

So far, indeed, I had supposed all parties were agreed in theory and in practice, till I read the "hints," now under consideration. But now, it seems, that my learned brother of the DENTAL COSMOS, although he so strenuously advocates the use of the lancet, discards its use, in such cases, as altogether too inefficient! And what does he substitute? Arsenical paste!

I have at least attempted to show, in the article above referred to, that with the exceptions just named, lancing the gums does not facilitate the extraction of teeth, and shall not, therefore, enter further on that argument now, but on the use of arsenic, suggested as a substitute, I will make some remarks a little further on.

These "hints" also say, "now, except in some cases from a neglect to lance the gums well and properly, or waiting until a tooth is in a proper condition to be extracted, a vast amount of pain is induced and unsuccessful cases met with. If such cases do not occur to writers against the practice, they do most certainly happen to those less skilled in the art." On this point we certainly have no controversy. Those unskilled in any art are always liable to meet with difficulties, perplexities, and unsuccessful cases. But I cannot, with the learned Doctor, on that account, "advise the latter to adopt" what he calls "the more certain and successful method," or any other unskillful or unscientific method. My advice would rather be, *learn the art.* And learn it by carefully studying the anatomy of the teeth, the jaws, the gums, and all their connections and surroundings; the proper construction of instruments to adapt them perfectly to the teeth and jaws, and the proper application and use of such instruments.

Again, the Doctor says, "We have said, also, that we do not attempt to extract a tooth until it is ready." This is certainly correct so far; but what constitutes the readiness of a tooth to be extracted? Common sense, surgical experience, and sound pathology would *seem* to say, when from caries or from any other cause a tooth had become useless, and it was beyond the reach of art to restore it to usefulness; if it be in itself painful, or if it be the cause of pain in other parts by reflex nervous action; if it be producing irritation, inflammation, or other disturbance of the surrounding parts; or, as frequently happens, general febrile excitement, it is ready to be extracted, and should be *at once removed*, on the plain, well-established surgical and medical principle, "to remove a disease, first remove its cause."

'Tis true that sometimes, if the periosteum of a tooth be much inflamed, or if the gums surrounding it are in that condition, the pain of extraction will be lessened by previously taking measures to subdue such inflammation; but even in such cases, the whole amount of suffering will generally be far greater by waiting and temporizing, than by the immediate extraction.

This temporizing course always reminds me of what, when I was a boy, I heard a physician tell an old lady who asked him if certain herbs would not be good for various ailments and complaints with which she said she was afflicted. "Oh, yes, ma'am," said he, "very good, if you do not die in getting well."

And now, seriously, if it be necessary thus to wait for a tooth "to get ready" before extracting it, why extract it at all? For as nature does not any more tolerate an effete or a useless thing than she does a vacuum, every useless tooth, and especially every crownless root of a tooth, will ultimately be thrown out, and off, by her without any foreign aid—that is, if the patient lives long enough to allow her to perform her work in her own way—but sometimes it is a slow and a painful process Yet she will always do it if we allow her time. But this is carrying the joke too far even for the Doctor; so he assists it to "get ready," by applying arsenical paste to the gums! And this to avoid pain!

My experience in the use of arsenic, and my observations of its use by others, has induced me to believe that it usually *causes* pain, and very severe pain. The Doctor is certainly right in supposing that his treatment by applying arsenical paste in the various ways that he describes, and among them, "making the slightest incisions with a sharp lancet on either side of a tooth, and in it insert the arsenical paste," "may be objected to because arsenic is poison." For one, I should most seriously object to that kind of practice, and for that very reason. And, although I would not like to acknowledge myself a coward, I frankly admit that I should be afraid to use the arsenic as recommended.

Several cases of the rather free use of arsenic have come under my own observation, which have induced me to be very cautious in its use. A few of them I will relate.

Shortly after the introduction of arsenic as an agent for destroying the nerves of teeth, I knew a young lady, resident of Pittsburg, Pennsylvania, who had arsenic applied to several teeth at one time, for the purpose of destroying their nerves. The application was made by a dentist of very considerable eminence at that time. Whether by carelessly letting the arsenic come in contact with the gums, or by absorption through the foramina of the fangs I do not know, but the result was severe inflammation of the mouth, extensive sloughing of the gums, the loss of nearly all her upper teeth, and a very narrow escape from death.

I also knew a man, some twenty years ago, who applied to a friend of mine, for the removal of a cancer from the lower lip, then about the size of a filbert. He feared the knife, and so went away and applied to a quack cancer doctor to have it removed. The quack applied arsenical paste, I suppose—at any rate, a caustic plaster. After being under this treatment about a year, the man returned with his lip nearly all eaten away; and to remove the disease it was then necessary to pass a knife along the median line of the lip from its margin to the point of the chin, and from thence up the cheek to a point just in front of the duct of Steno, and from thence again forward to a point a little above the angle of the mouth, including a small portion of the upper lip,—thus removing one entire half of the lower lip, a small part of the upper lip, and a very large portion of the cheek. I assisted in performing this operation—and it was done before the introduction of ether as an anæsthetic—and when the wound was so far dressed that the patient could articulate, he said that the pain for the last year, from the application of the arsenic, had been more severe, in any given length of time, than he had suffered from the use of the knife.

Every dentist must have observed, in the use of arsenic for the destruction of the nerves of teeth, that when even a very small portion of this poison finds its way to the investing membranes of these roots, it produces a very severe and painful inflammation; and every dentist knows, too, that it is very liable to find its way there, and especially in the cases of persons so young that the roots are not fully formed, and their foramina, therefore, comparatively large. Hence, I should not expect to avoid the infliction of pain by the use of arsenic as recommended. Still I have no doubt, if the gums were in a fungoid state, as described in one of the Doctor's cases, arsenic might be applied without producing much pain. But the Doctor says the arsenic does produce inflammation, and one of the almost constant concomitants of inflammation is pain.

Now, I have no doubt that an arm or a leg might be amputated with a butcher's cleaver, heated to whiteness, with less pain than it could be with the finest tempered, and sharpest Catlin. And I have no doubt but that a limb might be removed by the repeated application of lint saturated with arsenical paste—provided there was not enough of the arsenic absorbed into the system to produce death by poisoning, before that result was accomplished—but, in this last case, I do very much doubt if the operation would be a painless one. But, supposing the operation by the cleaver or the arsenic was less painful than by the Catlin, would the stump be left in as favorable a condition for healing? I think at the least, we could not expect the wound from the heated cleaver to heal by first intention. So, too, I think, if the Doctor will carefully examine some of his cases, that he has made *ready* for extraction, by the free and continued use of arsenic, he will find that the operation of extraction is a painless one, not because the investing membrane is "inflamed and thickened," and the root thus "loosened up," but because the membrane *has been* inflamed, and is now disorganized—destroyed; thus at the same time destroying all attachment of the root to its socket, and all sensibility. And I think he will also, most likely, find the alveolus in a state of necrosis, to a greater or less extent, and that no process of healing can take place until exfoliation has taken place, and even after that, especially if his patient should happen to be of a strumous diathesis, I think he might find on the gum, a disagreeable, unhealthy, poisoned ulcer, which may still take time and trouble to cure. A state of affairs which, I think, no well-educated surgeon would take either pride or satisfaction in having occur on his hands.

I did intend, briefly, to review the cases introduced by the Doctor, in illustration of his practice, but find it will make my communication too long, so, for the present, at least, I omit it; but, before closing, I will say that I agree with him entirely, that the cases he relates, and in the hands of all the parties concerned with them, "show that the extraction of teeth is not as well understood as it should be, or such cases could not occur except among the inexperienced." And I am happy further to agree with him in saying (although I sometimes use the lancet, and frequently the gouge, elevator, and forceps) "we do not hold it to be *modern dentistry,* except in rare cases, which the operator's better judgment will decide, to rush in pell-mell to cut, pry, gouge, and pull at a tooth, amid the shrieks and screams of an excited patient, as if he were catching a wild animal, simply because the subject might suffer an ordinary amount of prolonged pain." And I am happy to inform the Doctor that that is not the prevailing custom away out here in the country; and I am sorry to have so decided an indication, from so high a source, that it is in the great medical and surgical metropolis of our country.

In re-reading the "practical hints" I find a few minor points that I have overlooked in my little review, and to which I still wish to make a slight reference.

I shall do so now, only by expressing surprise that any well-educated dentist—and I know my brother of the DENTAL COSMOS to be such—should admit, "after due consideration," that there is any case of a tooth requiring extraction that "does not present a favorable prospect of a successful termination." Some such cases, of course, require more care, and skill, and labor to effect their removal than others, but I know of no cases that do not "present a favorable prospect of a successful termination." And if the writer of the "hints" would like to know more particularly how I operate successfully, and without the use of "arsenical paste," I would, most respectfully, refer him to an article, published by me on that subject, in the last January number of the *New York Dental Journal.*

And I must also express my surprise, that so critical a scholar in dental science as Dr. White should allow such a paragraph as this to pass from under his hand without explaining the "why and wherefore."

"When a fistulous opening exists outside of the face, the root of a tooth seems to be bound down in the socket more firmly than when the opening is in the gum," etc.

Now this not only *seems* to me to be a fact, but the reason why it is so is very plain.

The commencement of alveolar abscess, except possibly in some very rare cases, is in the pulp of the tooth, and where caries is the cause, in such teeth as have decay approximating to, but not entirely exposing the pulp. The pus first forms in the internal cavity of the tooth, and has no other exit but through the foramen of the fang. Then the first appearance of the pus outside of the tooth must be at the apex of the root. Now if this pus finds its way through the jaw, so as to "point" under the chin, or through the alveolus near its base, that is, below the gum, so that it will point on the outside of the cheek, but a very small portion of the periosteum of the tooth—the strong membrane that attaches the root to the alveolus—will be dissolved in the process of suppuration. But if the jaw and the lower and thicker part of the alveolus resist the action of the pus, so as to compel it to force its way up along the root of the tooth, through the periosteum, dissolving that membrane in its course, till it finally overcomes and bursts through the thinner part of the alveolus, it is plain that a considerable portion of the attachment of the tooth to its socket has been destroyed, and with it also a portion of the parietes of the socket itself, thus depriving it at once of both its attachment and support, thus loosening the *binding in* that it originally had. The one is not really "bound down in the socket more firmly" than the other,—for both are somewhat deprived of their original attachments,—but the other is less "loosened up" than the one.

WHEELING, VA., Aug. 1861.

LEECHES.

Their Therapeutic Value in Dental Practice—Pathological Conditions indicating their Employment—Mode of Application—Manner of preserving them.

BY PROF. J. RICHARDSON.

Leeches.—The leech is an "aquatic worm with a flattened body, tapering toward each end, and terminating in circular flattened disks, the hinder one being the larger of the two. It swims with a vertical undulating motion, and moves when out of the water by means of these disks or suckers, fastening itself first by one and then by the other, and alternately stretching out and contracting its body. The mouth is placed in the centre of the anterior disk, and is furnished with three cartilaginous lens-shaped jaws at the entrance of the alimentary canal. These jaws are lined at their edges with fine, sharp teeth, and meet so as to make a triangular incision in the flesh. The head is furnished with small, raised points, supposed by some to be eyes. Respiration is carried on through small apertures ranged along the inferior surface. The nervous system consists of a cord extending the whole length, furnished with numerous ganglions. The intestinal canal is straight, and terminates in the anus, near the posterior disk. Although hermaphrodite, leeches mutually impregnate each other. They are oviparous, and the eggs, varying from six to fifteen, are contained in a sort of spongy, slimy cocoon, from half an inch to an inch in diameter. These are deposited near the edge of the water, and hatched by the heat of the sun. The leech is torpid during the winter, and casts off from time to time a thick, slimy coating from its skin. It can live a considerable time in sphagnous moss or in moistened earth, and is frequently transported in this manner to great distances by the dealers."*

In this country, two kinds of leeches are employed for medicinal purposes, namely, the *European* and *American.* The two species may be distinguished by the color of the belly, which is greenish or greenish yellow in the former, and brownish orange or reddish brown in the latter. The American leech does not make so large or so deep an incision as the European, nor does it abstract so much blood directly or induce so much subsequent hæmorrhage. The two varieties mentioned attain an average length of about three inches, and will draw from one fluidrachm to half an ounce or more of blood each. The amount taken, including subsequent bleeding, will depend upon the condition of the leech at the time, and the state of the parts to which it is applied, the hæmorrhage being always greater where active inflammation exists, and the diseased textures are loose and vascular.

Their Therapeutic Value in Dental Practice.—When we reflect with what industry and avidity dental practitioners have appropriated and tested every remedy or expedient which promised to enhance their success in practice, it seems almost incomprehensible that so little attention should have been given to the great and unquestionable efficacy of local blood-letting, in the treatment of active inflammatory affections of the various structures of the buccal cavity. The familiar fact that inflammation, from whatever cause, occurring more especially in the dental pulp and membranes, is usually of the most active character, rapid in its development, intractable in its nature, and peculiarly prone to an unfavorable or fatal issue, would seem to suggest at once the propriety of abstracting blood freely and directly from the organs or structures implicated. While the great value of vascular depletion in all local inflammations of a sthenic and uncomplicated character is universally regarded by medical men as a remedial measure of not only unquestionable value, but as one ranking in prompt efficacy above any other single therapeutic agent, indispensable to the structural integrity of vital organs, and oftentimes to the life of the individual, there would indeed seem to be scarcely the shadow of an excuse for the manifest indifference with which its advantages are regarded by dentists who are daily called on to treat inflammation of structures which, from their very nature and circumstances, are eminently prone, under disease, to permanent impairment of their normal functions, or to rapid disorganization and death.

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* U. S. Dispensatory, p. 370.

Admitting the value of local blood-letting as a therapeutic agent in active congestion or inflammation of the dental pulp and associated structures, how may the operation be best performed? *Scarification* of the gums affords but a very limited flow of blood, the incisions becoming almost immediately clogged with coagulum, and no efforts to promote bleeding from such wounds will induce sufficient hæmorrhage to meet the indications. *Cupping* over incisions in the affected parts, notwithstanding instruments have been especially devised for that purpose, are inefficacious and objectionable, for the following reasons: 1. The process is prolonged and tedious. 2. The amount of blood which it is practicable to draw is ordinarily insufficient to produce any marked impression upon remote vessels. 3. Their application to sensitive tissues is exceedingly painful. *Leeches*, beyond all comparison, afford the readiest and most effective means of inducing the necessary flow of blood, and though their application within the cavity of the mouth may be objected to at first by the more timid and sensitive, yet, with proper management, the repugnance of the patient has been, in our own experience, wholly disarmed after the first trial of the remedy. They may be readily applied to any particular point; the bite produces but a slight and transient pain in the most sensitive tissue, while, by multiplying the number of leeches, any desired quantity of blood may be abstracted within a brief period of time.

Pathological Conditions indicating their Employment.—It is not proposed to discuss elaborately in this place the various diseased conditions of the teeth and surrounding structures which indicate the use of leeches, but would refer in general terms to the class of cases in which we have used them with the most gratifying success. It is only within the past two or three years that our attention has been prominently directed to leeches as a therapeutic agent in affections of the teeth, and still more recently, while we are continually extending the range of their application, we are led from experience to regard them more and more as altogether indispensable in practice.

1. *Odontalgia.*—Whenever the affection of the pulp inducing toothache is of an inflammatory type, but more especially if it is simply congestive, the application of a single leech will almost invariably afford immediate and complete relief. If associated with or dependent on caries of the tooth affected, with or without exposure of the nerve, relief may generally be had by the use of any of the palliatives commonly employed, and trial of the latter may be made before leeching, though for reasons which will be presently stated, we regard the practice as in some measure objectionable.

There are conditions of the pulp under disease, however, where such applications prove abortive, or furnish at most but partial relief, or where, if successful, the paroxysms of pain return at short intervals, sometimes with increased violence. Such cases are usually urgent, and the patient, intolerant of delay, is unwilling to await the slow action of arsenic, or submit to direct operation with instruments; besides, the operator may deem it of primary importance to preserve the pulp *intact*, with a view to its ultimate preservation. In such cases we know, from personal experience, that free depletion with a leech or leeches applied to the part will not only give prompt and certain relief from pain, but that it leaves the pulp in much better condition for subsequent treatment of the tooth.

We have before intimated our objection to the use of the ordinary palliatives in these cases. If toothache is associated with exposure of the pulp—and, from the history and examination of the case, we are led to believe that the diseased condition has not been of sufficient intensity or duration to produce structural lesion of the nerve—it seems to us that, if its ultimate preservation is contemplated, a sound discretion would dictate the employment of such means as would effect a reduction of any existing congestion or inflammation without leaving the slightest trace of any organic change in the pulp or its membranes. Now by far the greatest number of agents ordinarily employed to abate the pain of toothache are such as produce, chemically or vitally, some structural changes by which the organic integrity of the pulp or its membranes is impaired; and such changes, however slight, will, we believe, in all cases decrease the chances of its being saved alive under subsequent treatment. The history of our art, we believe, attests the fact that medicating exposed dental pulps has not met with very encouraging success. The light of experiments teaches us to tamper as little as possible with this organ when denuded, unless with a view to its destruction—a mode of treatment for which we confess no partiality.

We repeat, therefore, that in the class of cases mentioned, where the structural integrity or continuity of the pulp or its membranes is likely to be endangered by the application of substances applied directly to them, the highest interests of the patient, and a plain professional obligation having reference to future operations upon the tooth, should induce us, in all practicable cases, to resort in the first instance to blood-letting, the effects of which in the alleviation of pain are quite as prompt, more certain, and more permanent.

2. *Periodontitis.*—In acute inflammation of the periodental membranes, uncomplicated with abscess or ulceration, the operator may always expect to realize marked advantages from the use of leeches. Local depletion in the class of cases under consideration would, in an especial manner, induce early and prompt resolution, and we should not for a moment hesitate to apply leeches in preference to any other known mode of medication.

3. *Alveolar Abscess.*—Predicating our views on generally accepted pathological doctrines, we should not expect to realize any considerable advantages from local blood-letting where inflammation had proceeded to suppuration. And yet, in the case of an alveolar abscess, during its formative and more active stages, we can comprehend in what manner the free abstraction of blood from the immediate neighborhood may not only greatly alleviate the suffering attendant upon this most painful affection, but also how it may be brought to a more speedy termination. In the more active stages of the disease, when purulent matter has penetrated the maxillary bone and invaded the gum, lip, or cheek, all the blood-vessels of the parts become greatly turgescent, organizable fibrinous products are thrown out upon the borders of the extending abscess, and the neighboring cellular tissues soon become gorged with serous infiltrations. Now any mode of medication that will serve to unload the blood-vessels of the parts affected, will fulfill three important indications, namely: 1. The mitigation of pain by relieving the nerve-fibrils from compression incident to the unnatural fullness and distention of the blood-vessels, as well also as by lessening the stimulant properties of the blood itself. 2. The removal of effused serum by virtue of the increased absorbing powers of the vessels after depletion. 3. The retarding of lymph formations, by which the contained pus is enabled to make its way more speedily to the surface.

As a pertinent case in this connection, we may mention that of a lad some fifteen years of age who came under our care some three months since. He presented himself for the first time with an abscess forming above the upper front teeth. The four superior incisors were quite loose and very tender to the touch. The gum about these teeth was tumefied, very red, sensitive, dry, and hot, while the upper lip was swollen to twice its usual size, and the cheeks were much puffed. There was a feeling of obscure fluctuation in the parts, but the pus was deep seated. He was nervous, much prostrated, and faint from long-continued and excessive pain and loss of sleep. With no expectation except that of affording him a temporary respite from his sufferings, we ordered three leeches to be applied over the roots of the affected teeth. The moment they were removed, the leecher subsequently informed us, the boy threw himself upon a lounge, fell instantly into a sound sleep, and awoke, after an hour of undisturbed rest, much strengthened and refreshed, and almost wholly free from pain. In about thirty hours the contained pus discharged spontaneously through the gum, and in two or three days thereafter all active symptoms had disappeared, and the teeth became firm as usual. I cannot doubt but that the course of the disease, in this case, was materially shortened by the leeching—the prompt and permanent mitigation of suffering was certainly due to the bleeding.

NOTE.—Owing to a press of matter, we are compelled to omit the publication of the latter part of Dr. Richardson's article until the next number.

ETIOLOGY OF THE DISCOLORATION OF TEETH.

BY C. P. FITCH.

THIS subject possesses much general importance, and to the dental practitioner is of great practical consequence. Occupying a responsible position as a representative of a rapidly growing profession, and meeting, as he must, in almost every mouth examined, various shades of normal and abnormal tooth structure, it becomes a matter of even more than practical moment, an imperative duty, for him to understand the entire subject of tooth discoloration.

Familiarity with this subject, then, is a necessity imposed by a suffering public, that expects a ready response to its claims by a wise and successful application of therapeutic means. Understanding, as he may, theoretically, the nature of dental structure, the various tissues implicated in the diseases incident to these organs, and the many agencies which may, and often do, exert their deleterious influence; yet it is absolutely essential that he enters this field of exploration for himself, satisfied that if successful, personal research will yield a rich return of benefits to those committing the conservation of their teeth to his skill and integrity.

The normal complexion of teeth varies according to the preponderance and arrangement of elementary constitutents. If the inorganic or mineral substances are in excess, a chalky, pearly complexion of tooth is the consequence. If the organic or animal material preponderates, the various shades of yellow appear.

From the fact that color is not an entity but a reflection, it follows, therefore, that molecular arrangement determines in a very important sense its particular shade or hue. Whenever this molecular change occurs in tooth structure, as we contend that it often does, it very sensibly affects the appearance of the tooth.

We find a very great variety of color in the sea-shell, which is no doubt due to molecular arrangement; all possessing nearly the same constitutents. Also, for instance, in early life we see that the teeth are white and pearly; but as age advances, gradual changes take place in their complexion. They slowly, but very perceptibly, grow darker, until finally, in old age, they are many shades darker than in infancy or youth. The milk teeth are often quite white and clear, while the permanent are yellow and opaque. These changes are inherent and not external. Thus, frequently we hear patients remark, "My teeth are not near as white or clear as they formerly were, and all the brushing that I can bestow upon them does not seem to change their complexion in the least." And they imploringly ask for some preparation that will clean or make them white again. But why this change in color as age advances? It evidently arises from physiological causes; or it may be due to pathological action. The cause is clearly a vital one, and that it produces some molecular change in the elements of tooth structure. It is fair to conclude, then, that anything short of constitutional treatment will fail to reach the difficulty. And it is questionable whether this evil, if indeed it may be called an evil, can be removed in the least by any such means.

The causes of abnormal discoloration of teeth, more particularly under consideration, may be vital, chemical, or physical; acting directly upon the teeth, or upon agents which react in turn upon their internal or external structure. From the fact that the enamel is translucent, and the dentine has a vascular circulation, in character peculiar to itself, it follows that any coloring matter permeating the tooth substance, either by tubular imbibition or periosteal endosmose, may affect quite considerably the appearance of its texture. It makes no difference, so far as the result is concerned, whether the pigment is held in solution in the fluid circulating in the tubuli of the tooth, or deposited upon its tubular walls, its presence will be equally detected in the appearance of the tooth. For instance, madder mixed with the food of an animal will very soon make its appearance in the teeth of that animal, imparting a red hue, which will soon disappear after the feeding of madder is arrested; showing that the plasma of the blood conveys coloring matter into the dental tubuli, and, in the above instance, as readily removes it, without leaving any permanent results.

Nitrate of silver, and many of the other metallic salts, taken into the system for any length of time, will not only discolor the skin, but will also, to some extent, discolor the teeth. But the stain or discoloration from such materials does not so readily pass away.

The disintegration of the red corpuscles of the blood is another source of discoloration. The hematine, or iron, which is supposed to constitute the pigment of these globules, passes readily into the tubules of the dentine from the pulp chamber of the tooth, whenever the red disks are disintegrated, and the discoloration becomes more or less permanent.

These red globules may be dissolved or broken up, either by congestion, pyæmia, or by the fluid or plastic character of the liquor sanguinis or blood plasma. This fluid condition is frequently, if not always, met with in the hæmorrhagic diathesis.

Congestion of the pulp may be induced by concentrated and continued innervation; but most generally by nerve exposure, irritation from external applications, and severe tooth concussion, etc. Pyæmia may be, and doubtles is, the result of a disturbance in the life force which determines form and structure. Organic and inorganic poisons, vicious habits, as well as defective alimentation, have their respective and aggregate influence in assailing the integrity of the biotic force, which goes far in establishing the diathesis *purulenta.*

Of the numerous agents whose tendency is to produce a fluid condition of blood, I will mention but two classes, mercury and some of the alkalies. Whereas, the various salts, found in the succulent vegetables, establish the plasticity of the liquor sanguinis, or prevent exudation of this pigment through the corpuscular wall by exosmose. No doubt the debris or effete matter arising from the worn-out tissue collecting in the organism re-enters the circulation, and, poisoning the life currents, promotes vital disturbance, preparing the system for a ready response to any and every disease assailing it, and must affect the appearance of the teeth more or less through diseased organic or functional action. Neutralization or elimination of these poisons is essential to health in any sense.

Much of the discoloration arises from a collection of dark, sanious matter in the pulp chamber and fangs of the tooth. The death of the nerve, either before or after stopping the tooth, is a prolific source of this evil. The practice of stopping this class of teeth, leaving their fangs untouched, is to be highly deprecated, and the half-way manner of stopping the fangs is also much to be regretted; for the difficulty is neither prevented nor removed, when existing, but frequently increased. Better remove such teeth entirely from the mouth than adopt such a treatment.

Tin, amalgam, and other kindred metallic stoppings are the source of much discoloration; especially is this the case, if the operation has been imperfectly performed, and the secretions of the mouth are in an abnormal condition. Dentifrices, tooth washes, tobacco, and a host of other agencies which might be noticed, play a very conspicuous part in defacing and rendering repulsive these beautiful and serviceable organs of man's masticating apparatus.

After years of careful observation, I am fully persuaded that the chemical and physical agencies above enumerated, which agencies are mostly, if not entirely, under the control of the dentist, are mainly implicated in the discoloration of the teeth.

A case occurred in my practice, some years since, where a lady with a fine set of teeth, obtained a tooth wash from some traveling mountebank, recommended highly for beautifying these organs, which wash contained, as it was afterward ascertained, nitric acid. At first the teeth were improved in appearance, but soon turned quite dark, until, after repeated applications, they were mostly destroyed, leaving black and hideous remains.

I will mention further but a single instance touching discoloration, which occurred recently in my practice in this city. A gentleman with an incisor tooth very painful and much discolored, applied for consultation and relief. The tooth had been stopped some months previous. The nerve was dead; the fang was discharging freely from a fistulous opening upon the gum. The stopping was removed, tooth treated, its health and natural complexion restored, and refilled. I may just add here, that a permanent stopping was placed in the root at the time of refilling the tooth. No return of trouble as yet, after the lapse of some months.

PHILADELPHIA, Sept. 17, 1861.

"WHAT LACK I YET?"

BY WM. H. ATKINSON, M.D.

[Read before the American Dental Convention, New Haven, Connecticut, 1861.]

THIS is the query of him who thinks himself nearly complete, as is plainly evinced by the character of the young man "whom Jesus loved."

Were this query earnestly repeated by each, at every period of his advancement, the impetus of professional progression would be unparalleled. Let each repeat it to himself every day at the close of active projective works, for it is properly the inception of receptive works, so necessary to open our understanding to the full comprehension of the daily necessities of our calling. To recapitulate in the cool moments of quiet reflection, after the excitement and wearisome efforts of the day's toil is past, will enable us to see much wherein we lack of being up to the full measure of perfect works—in understanding, social intercourse, and in performance of true professional service. How often will we see that the financial aspect has too much entered into all these elements of a perfect professional service!

How frequently do we hear the more advanced in our body declare plainly that they "work for money!" have "got past operating for the fun of it!" And how very seldom we hear, from the lips of old or young in the profession, the expression of the determination to give the requisite time, attention, and earnest, prolonged effort to the accomplishment of whatever they have in hand, in the best possible manner the particular case admits of, whether they ever receive a dime for it or not!

The desire to do a great deal of work in a given time, because of the increased income, dollar-wise, is, in fact the almost universal besetment of the professions: and I am sorry that I cannot, in even a small degree, set ours above others in this respect. The amount of good, rather than the amount of work we do, should be the object of desire. All who lack thoroughness will be wofully wanting in the balance; and as earnestness is the primal prerequisite — 1st, to thorough understanding, and 2d, to proper execution of our functions, let us early see to it that we lack not it. Let me, in the most solemn and earnest manner assert, that the very highest possible remuneration to the sensitive professional mind, is the certain consciousness of having executed a service above the measure of pecuniary calculation; and also to assert my conviction, that the cause of all strife, respecting either the diagnosis, execution of, or remuneration for, professional services lies at *our* door, and not at that of the patient. For, if we were so truly in earnest in the exercise of our highest ability, at every opportunity for its exhibition, as never to be entrapped into undertaking incompatibilities, we should avoid all collisions as to methods or compensation.

The *professional man* thoroughly prepares himself for the full exercise of his specialty, and then opens an office for the accommodation of patrons. The quack acquires some of the more apparent qualifications for a profession, and in hot haste announces to the public the unparalleled advantages to patrons, there is in his peculiar ability to render easy and cheap the services which are difficult and expensive when performed by the skillful practitioner.

New countries are liable to pass the ordeals of quackery before securing professional ability, and all communities are doomed to the same experience in cases of new professions arising upon the exigencies of cases or times.

The deepest *hells* of malpractice frequently induce the highest upheavals of competent skill.

Especially has it been the lot of our profession to prove this last assertion, for the bold recklessness of American cupidity and self-sufficient ignorance has shown us, in such multiplicity of instances, the way *not* to go, that *the* way *now* is open to earnest inquiry, in which we *ought* to go, to attain a capability above that of our staid European brethren, who have no such grievous sins to pain them in their remembrance — their sins being but venial in comparison to ours; they have not been convicted of sin at all, for they feel that if they do as their fathers did, they must be in the true path, thus failing through their very innocence and patience, of the advancement, that we have by recklessness and restiveness attained.

The patent recklessness and haste in our whole community, are exhibited in the unexampled need for skill in all professions, but especially the *dental.*

I. Lack of knowledge how to raise children, displayed in the universal neglect of the essentials of their physical well-being, while the souls and minds have been drilled almost to death.

II. Lack of *willingness* to cultivate their bodies in an equal or supe~~rior~~ degree to their minds, (a fatal mistake to both soul and body.) Not one per cent of the parents who have consulted me in reference to their children's teeth, were at first prepared to admit, or willing to learn, that the first permanent molars belonged to the adult set of teeth.

III. Lack of confidence in ourselves, which naturally begets lack of confidence in others' ability; and thus, a selfish spirit has well-nigh prevented the growth of, or crushed out all true professional confidence and fraternal probity.

The immense preponderance of those who are forced to wear dental substitutes or go without teeth, need but to be named to prove the propositions laid down. He who has eyes, needs no labored argument on the question, which has thus far held the field in numerical strength, throughout the whole range of professional callings, professional men or quacks.

In our department, so wofully has the evil prevailed, that mutilation stares us in the face in our street walks and social intercourse ten times, where once our eyes and hearts are blessed with a view of the legitimate success of the accomplished Christian dentist.

It is not so hard to prescribe rules of correct practice as it is to follow them faithfully amid the daily conflicting influences of social and professional contact.

Could the honorable young member of any profession be set above pecuniary want, the first great victory would be won; for then he would scorn to essay the exercise of doubtful ability for the sake of subsistence.

The only unitary reason for any contention about price of service is, that each endeavors to cover more ground than legitimately belongs to him, and thus hopes to lay tribute, not only upon his patrons, but his workman, so that he may gain a competence upon which to retire in a *short* time. As soon as any professional man acquires the ability to render clean service, he should have clean pay. Services and remuneration must accord, or equipoisity is lost, and then there must be jars to equilibrize them ~~again~~. Hence, the everlasting contentions upon the vexed subject of price.

There is but one way fully to settle this matter, so that exact justice can be attained by all, viz.: require prompt pay. After all, this is the great peacemaker, for much service is quite satisfactory when *paid* for, that would be the source of contentions, heart-burnings, and misrepresentation if not settled for at the time.

I have never known a fee-bill to be lived up to for any considerable ~~length of~~ time, by all the members of the body establishing it, either in law, medicine, surgery, or dentistry, any more than are the rules proposed for the regulation of trades and commerce in general. Infraction and smuggling are practiced everywhere. The "meum" seems to be well apprehended, but, judging from appearances, among the many; the "tuum" either has no existence or has been ignored.

Lack of *professional* breadth lays the foundation for this, and lack of *Christian* breadth keeps it alive. Had we as a body attained either the one or the other, its congener would soon take possession of us in all our practices and intercourse; but the desire that springs up spontaneously in the heart for association, is dried up and killed out the moment we begin to calculate what it will cost. Be assured that the greatest lack of the profession, after breadth, is want of earnest, frequent communion, and the time has come when we cannot afford, even in a pecuniary sense, to ignore association.

For, as where the most fuel is, the fire is the hottest, so where the atmosphere is redolent of truths and facts, principles and methods, the most rapid and least expensive advancement will be. Then let us come together in the spirit of true fraternity, and fill up, one after another our loathsome lacks, that we may finally stand disenthralled and fully enfranchised with all that constitutes the truly professional Christian gentleman.

Had we one single leader that filled this measure, and devoted himself to the elevation of our standard, regarding that work as a mission committed to him that he dared not neglect, more would be done to advance the profession in the next half decade than has been done in all the past. This may seem like hyperbole to some, but it is sober truth, and will be demonstrated to the most obtuse when the conditions are fulfilled.

Who, among us all, that has tasted the sapid contact of open, free, fraternal association in our conventions, and more regular gatherings, but has resolved at the time, to make it a point to be more prompt in their support in the future? But, alas! "like the sow that was washed," we too often drop into the old mire of isolation upon our return to our fields of daily labor.

I do not say that *all* who ever enjoyed contact, in our gatherings, thus resolve, but I do say, all who are *alive*, and worthy to enjoy such opportunity repeated, do make, honestly, just such a resolve. Circumstances may control us for a time, but if we are in real professional, Christian, or human earnest, we will make circumstances in turn come under our control, and minister to our joy and profit every way.

Here, as elsewhere, he who is smally solicitous "to save his life" (time and money) "shall lose it;" while he who is willing to trust God or noble humanity, even if he should lose part of his time, money, or life, will the more certainly "find it."

Having freely received of the arduous labors of others, it is imperative that we as freely give (not sell) to others of our labors.

Lack of ability or willingness to communicate what we know, is a heavy incubus upon the profession. I often *feel* that an earnest spilling over of our best and choicest items, is but too nearly allied to casting pearls before swine; yet one advantage it always possesses, *i.e.* the disposition and ability to communicate are both increased by the practice even at the hazard named. Lack of habit of communicating, or want of "keeping the hand in," is also a fruitful source of failure to otherwise competent and efficient workers.

If we have new cases in abundance, we need not recapitulate in the laboratory, the cases of our pupilage and daily toil, for in those new cases we have the double stimulus of *doing* good to *others*, as well as receiving good. In like manner we should recapitulate our studies, texts, and old journals, in the lack of new matters, upon which to appease our mental appetites. It is, depend upon it, a possible thing to forget; the hand may forget its cunning, and the heart may forget its interest, in the multifarious exercises of life; hence, the necessity of a survey, to show us certainly where we stand now, that we may be stimulated to proper excellence in the work of "head, heart, and hand."

It was once queried, "Thou that teachest, a man should not steal, dost thou steal?" We all acknowledge the rectitude of principles; let us see to it, that we also respect the rectitude of correct practices, by coming out of our puerility and self-hood in these, as fast as we may. Earnest preparation, close examination, faithful execution—cleansing and purifying ourselves by severe recapitulation, at each period, repeated throughout our career, will insure proximate completeness to every one honestly exercised thereby.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of September 10th, 1861, at eight o'clock.

Vice-President, Dr. T. L. Buckingham, in the Chair.

Present, Drs. Harris, McQuillen, Kingsbury, Flagg, Fitch, McGrath, Stellwagen, D. Roberts, Hopkins, Garretson, and Barker.

The President stated the subject for discussion to be

"THE EXAMINATION, PREPARATION, AND FILLING OF APPROXIMAL CAVITIES"

Dr. McQuillen remarked, in opening the subject for the evening, that in the consideration of practical subjects very little could be said that would be new to those who have been engaged for years in the practice of the profession. The educated practitioner, indeed, needs rather to be reminded than to be *taught;* and there are many points essential to success which may escape one's memory, particularly in professional isolation. Hence, the great advantage arising from association and free interchange of views. Again, in the publication of such discussions, that which may be very old to some, may be perfectly new to others. Disclaiming anything like a desire to establish the credit of priority, (a matter which he always regarded of very little moment,) he yet did feel quite solicitous to correct certain impressions with regard to a mode of practice which he had pursued with fair success and advocated for years, as it appeared to be misunderstood by some, and was unquestionably misrepresented by others. Believing the mode referred to as eminently utilitarian and conservative, he hoped that it might be presented in such a manner as to overcome the objections to it.

To properly discuss the entire subject under consideration, it will be advisable for us to consider it under three heads—1st. Examination. 2d Preparation. 3d. Filling.

Examination.—Although it could not be claimed with any degree of truth, that the difficulties attendant upon the formation of a clear and accurate diagnosis of the location and character of dental caries are comparable with those which environ some of the affections which the physician or surgeon are called upon to treat, it must be admitted that the same high order of intelligence, keenness of perception, and extended experience are demanded to enable the dental practitioner to decide in doubtful cases in a manner which should be satisfactory alike to himself and patient.

The first step in the examination is to remove the tartar, or other foreign substance that may have accumulated around the teeth and completely screen caries that have progressed but slightly or quite seriously; after this, with a clear, oval mouth-glass, and very thin malleable probes, a careful survey should be made, and each defect observed noted; in localities where the teeth are so close together that it is impossible to pass a delicate probe or floss silk, or in doing so with the latter, it breaks as if cut with a knife, wedges of india-rubber, wood, or cotton should be introduced to separate them sufficiently to determine beyond a question of doubt that the part is decayed or not. To employ the file or chisel in opening such a locality, and then find it unaffected by caries, would not only be reprehensible, but also be doing the patient a grievous wrong. At the same time, it would not do to pass it by entirely, for decay progresses so insidiously and rapidly in such situations, that before the patient or practitioner is aware the dental pulp becomes exposed. Even with the most careful scrutiny, there is danger of overlooking a defect. No doubt every member of the Society could recall some instances in which they had been led astray in that respect. Dr. Townsend, in conversation with him, had frequently alluded to this matter, and acknowledged that he had sometimes been deceived. He was free to confess he had been, and that it had taught him to be cautious in giving an opinion for or against a case. Too much stress could not be laid upon the necessity of having a good light for the examination, and the bearing in remembrance that if a tooth is decayed on one side of the mouth, it is a fair presumption that the fellow of the opposite side is similarly affected.

Preparation of Cavities.—It was to this division of the subject reference was made in the opening remarks. He felt that the old mode advocated by the text-books, of filing immense V-shaped spaces between the bicuspids and molars, whereby two-thirds of the masticating surface of those teeth is sacrificed, could not be too severely animadverted upon. The teeth of human beings are intended to subserve three great purposes—*mastication*, *speech*, and *appearance;* and the dental practitioner who does not fully recognize this fact, or boldly sets it at defiance, is not up to the present advanced state of the profession. Mastication, however much neglected by the American public, is important to all, and care therefore should be exercised to preserve as much of the triturating surface of the teeth as possible; to the public speaker, whether the minister in the pulpit, the actor on the stage, or the orator on the rostrum, the reckless destruction of the greater part of a tooth may as materially affect the articulation of the voice as the entire removal of a tooth; and, lastly, the practitioner who cuts and files away teeth without regard to symmetry or anatomical characteristics, thereby mars the human face divine. He did not wish to be understood as opposing the V-shaped space within proper bounds, but as objecting to the apparent non-recognition of the points dwelt upon above. It was his invariable habit to make a V-shaped space, but was careful to remove no more than was absolutely demanded, and taking more from the palatine than the buccal sides of the teeth. To obtain space for filling depended more upon cutting away the grinding surface over the cavity with chisels, as this afterward could be replaced by gold foil. Such a cavity, when thoroughly excavated, would constitute what is called, by some, a compound cavity, in other words, having a floor and two lateral walls. There may be a propriety in employing that term, but he regards such a cavity as one much more easy to fill than where the V-shaped space alone is made. When the posterior and anterior approximal surfaces of adjoining teeth are affected, he depends to a great extent upon the space obtained in the excavation of the anterior tooth for operating upon the tooth back of it. There was one point in particular which should not be overlooked, and that was to have the edges of the cavity perfectly free from any roughness; to obviate this, they should be filed, scraped, and polished.

Filling.—In filling such a cavity, he would invariably use pellets, formed from a rope of gold cut into a number of pieces; for his own purposes he vastly preferred these to cylinders or ropes; he did not wish to be understood, however, as taking exceptions to the latter in the hands of others. In introducing these pellets, while feeling equally desirous to have the filling compact throughout, he was more concerned about having that part which came in contact with the parietes of the cavity perfectly consolidated, (*particularly at the neck of the tooth,*) than anywhere else. These pellets he introduced piece by piece, consolidating each thoroughly before bringing another in contact with it. To prevent the piece slipping from its position, he employed a retaining instrument, described in a recent number of the DENTAL COSMOS. He frequently makes use of the adjoining tooth as a posterior or anterior wall, according to the location of the cavity; after the gold is all introduced, the filling is made flush with the margins of the tooth; the portion which constitutes the masticating surface presenting a concave inclined plane. He was far from claiming that this plan should be invariably adopted, or that all operations performed in this manner would prove infallible. The latter was something which he neither claimed for himself or accorded to others.

In conclusion, he desired to say a few words with regard to instruments; he vastly preferred those which have been generally adopted of late years, with serrated points. These points, however, should not be cut very deep; it is only necessary that the end of the instrument should be in a roughened condition. With deep cuts in the instrument, the long points that are formed pass into the gold and leave deep depressions that the next pellet does not, and cannot, pass into, so that if it was possible to make a fair section of such a filling, it would be found to present a honeycomb appearance. It has been urged, by some, that if the gold is in perfect contact with the parietes of the cavity, this honeycomb condition is a matter of little moment. Now, we have no guarantee that such would be the case; and, again, as it is an unquestionable fact that fluids will permeate solids, the imbibition of the saliva by the filling would be very likely to eventuate in its gradual disintegration.

Dr. Harris said, those molar teeth having deep sulci were apt to break off at the cusp over or below the approximal filling, and he thought it best, where there was approximal decay, to file a V-shaped space, carrying the cut beyond the first sulcus. Considered a plugged surface should be so free and clean that food would not become impacted between it and the adjoining tooth.

Dr. D. Roberts said, having met with the best of success in the use of the file on approximal decay, he would therefore advocate it, not however to use it slightly, but to form a good V-shaped space that can be easily kept clean, and where food will not accumulate. He frequently met with patients whose teeth had been left, after filling approximal cavities, so that the surfaces would be nearly or quite in contact; and as food accumulated in such spaces, the patients would work with the toothpick to remove it, and continue so to do until the gum, becoming inflamed, that they would come to him, insisting the fillings were imperfect, and that the teeth were decayed. This difficulty was, however, removed by filing a good V-shaped space between the teeth, from which the tongue and saliva would remove all foreign particles. Dr. Elisha Townsend once filled a tooth for him on its approximal surface, without filing any space between it and the adjoining tooth, and it gave him so much trouble from the constant desire to pick at it that he went to him, and induced him to remove it, and file a good V-shaped space that he could clean at any time by running the end of his handkerchief through.

Dr. Fitch said, the conditions of teeth found in any mouth must always govern and determine dental manipulations. It would be desirable to leave every filling with a cleansing surface; but this desirable object could not always be attained—a set of definite rules would not apply in every given instance—yet a few general suggestions would be found applicable in almost every operation. With approximal cavities of molars and bicuspids, the degree of decomposition must always govern the shape of the space left. If decay did not extend to the coronal surface, or so far in this direction as to endanger the operation by leaving a thin lamina of tooth over the filling, he would cut but little, if any, of a V-shaped space; but in such instances, with the file and other instruments make room to reach the cavity and save as much of the labial and approximal surfaces of the tooth as possible. The first duty of an operator is to preserve as much of the tooth as circumstances will allow, having regard to the beauty and integrity of the denture as well as the permanency of the operation. In many instances, the former must be sacrificed to the latter; but an operator is not at liberty to cut away a tooth one-third merely to obtain free approach to the cavity; for, as a general thing, this very desirable desideratum can be secured by other means. The position he would wish to take was this: the surface of the gold when left should present an inclined plane, either on a line with the axis of the tooth or toward the palatine wall, in order to prevent the retention of food and to preserve intact the exposed surface of the tooth. With the class of teeth now under consideration and with approximal cavities, a V-shaped cut is often very desirable. This should always be preferred rather than to sacrifice a considerable portion of the approximal labial surface. It allows of a direct approach to the cavity, and when we remember that gold is condensed on a line with the force, and not laterally, it much facilitates the operation. At all events, enough of the coronal surface, extending into their depressions, should be removed, so as to leave a thick or heavy shoulder of tooth substance to subserve the future purposes of mastication without endangering the filling. It will be found, as a general thing, that these coronal depressions are very defective and will need to be removed; and thinks that we are not in the habit of directing our attention to this fact as much as we should do in the preparation of a cavity. With the incisor teeth, uses the file but little, and wedges considerably with *wood;* leaving the cut wider toward the palatine surface. In many instances has found teeth receding abruptly toward their roots, leaving but a short distance of the approximal parts near the grinding surface in contact. With such teeth, the file should be used as little as possible. If an inclined plane is made between such teeth, much of their usefulness and beauty must be sacrificed; agreed with Dr. McQuillen in reference to the shape of the points of the pluggers employed. Never used deep serrated instruments, for two reasons; they were very apt to leave the gold quite porous or in a sponge-like condition, and there was great danger of dragging out the gold while withdrawing the instrument; used serrated points, and these quite small. Contended strongly for a uniform condensation of the gold; and this was readily attained with the use of the above instruments and careful progressive manipulation. The filling should be made uniformly solid throughout.

Dr. Kingsbury remarked that the importance of a thorough examination of the teeth, in regard to approximal caries, could not be overrated. The experienced practitioner could not have failed to notice that, in the case of a large proportion of his patients, the dental arch was marred by the premature loss of one or more of the superior bicuspids or molars. In such, decay had commenced upon the approximal surfaces, and progressed in an insidious form until their pulps had become exposed, and the teeth had been extracted to obtain relief from pain, or if filled, the operation had been delayed until the teeth were almost worthless. He would mention a case that had very recently occurred in his own practice, of an obscure nature, that clearly demonstrated our liability to be deceived, and the difficulty experienced in obtaining, at all times, a correct diagnosis.

The patient was Mrs. ———, a lady who bestowed more than ordinary care upon her teeth, and had been in the habit of calling upon him as often as was deemed necessary for the last eight or ten years, for his professional advice and services. During his last engagement with her, while filling some of her teeth, she called his special attention to the inferior bicuspids of the right side, and expressed a fear that one or the other was decayed upon the approximal surface. He examined them as he thought carefully, and decided that they were not decayed. Not long after, as he was about to dismiss his patient, she requested him to examine said teeth once more, remarking that she had occasionally experienced a slightly painful sensation upon taking cold water into her mouth. As the teeth were close together, he introduced a narrow wedge of orange wood to force them a little apart, and with a fine-pointed probe he then detected a slight defect on the distal surface of the first bicuspid. He at once made a separation with a file, and to his surprise found that the slight defect was a small opening into a large cavity of decay that had nearly reached the pulp. There was, however, no perceptible degree of opacity or variation from the normal shade to indicate the existence of caries. It was a case in point, proving most conclusively that the long-practiced eye, aided by the most favorable light, is not always adequate to detect approximal decay. In that form of decay denominated chalky, he had no doubt the dentist was often deceived. He could not be too faithful in this part of his professional duty, for if the patient seemed disposed to complain of his finding too many defects—as, he regretted to say, was sometimes the case—let him remember that it was due to his profession, as well as to his patient, to ascertain, if possible, the actual condition of his patient's teeth, and to state the same without reserve. As well might the physician, when called to a patient suffering from malignant complicated disease, be indifferent about his diagnosis, as for the dental practitioner to be careless or superficial in his.

The method of filling approximal cavities in the molars and bicuspids advocated by Dr. McQuillen, he had practiced for some years in the case of such teeth as required to have their pulp cavities and fangs filled. He cuts away the grinding surface until he can obtain ready access to the canal of each fang, and in the operation of filling restore the crown of the tooth as nearly as possible to its original form. If teeth of this class, without nerves, could be filled in this manner so as to preserve them effectually for years, and render them efficient for mastication, he could see no reason why teeth of a better class—teeth with living nerves—might not be filled with equal or even better success. In all cases where large cavities are filled, he thought it indispensable that the gold should be introduced in small portions, and be successively impacted and consolidated until the filling was completed. It was useless to attempt to make good approximal fillings without ample space between the teeth. Many failures resulted from the want of sufficient room to admit of thorough manipulation.

In filling the front teeth, he usually separated with a thin file, making the separation upon the lingual surface somewhat wider than upon the labial; and then introduced gum-elastic, wedges of wood, or cotton, to increase the space to any desired extent. From three to six days he found a sufficient length of time to effect the object without inflicting much pain.

He usually inserts a wedge of orange wood between the teeth close to the gum just previous to excavating, and lets it remain until he has finished the fillings. It serves a most important office. It enables you to retain the space already gained; it gives firmness to the teeth during the operation, and, what is of the highest importance, prevents the mucous secretions from coming in contact with the gold before it is properly condensed.

Dr. Fitch said, as a general thing, sufficient care was not observed in the preparation of the cavity. It should not only be thoroughly cleansed and properly shaped, but the edges of the peripheral wall should be dressed and polished highly before attempting to fill, so that after the filling is inserted there shall be a finished tooth surface. By this arrangement, a proper strength of tooth wall is secured to work against, and nothing is left to uncertainty in the final finishing of the filling. This preparation of the edge of the cavity is a very important operation, and should never be omitted. Called particular attention, where the gold was used in cylinder form, to the fact that defects are very liable to be left at the sharp angles of the cavity. Instanced a case, where a tooth was plugged with cylinders, and was thought to be quite perfect; and yet, on close inspection by another operator, a defect was found at an acute angle of the cavity, readily admitting the small point of a plugger. Had found the best method in all cavities was to protect the weak and difficult points to reach, by a block or cylinder thoroughly condensed, and then, with instruments having small, serrated points, building on the gold perfectly, until the last piece was brought to it, crowning the entire filling with a uniform solidity, and possessing a susceptibility of very high finish. The condensation could be accomplished equally well with the mallet as with the hand. But the idea which he wished to make prominent, was the necessity of concentrating the force to a point, or in other words, focalizing it.

Dr. Flagg said, where a V-shaped space was made between teeth, it should be done well, and was entirely opposed to the small separations, where food would accumulate, causing constant annoyance to the patient, besides acting as an excitant to dental caries. Dr. F. drew a diagram, and presented at some length his method of preparing and filling molar teeth where there was approximal decay—advocating, first, the introduction of cylinders into the cavity, and then to finish the filling with small pellets of gold, uniformly condensed. Having used gold in all the different methods for filling teeth, he thought, so far as his own operations were concerned, those teeth filled with cylinders, in the manner just stated, would be found in a better condition than those introduced by himself in other ways.

Dr. Harris advocated the use of cylinders, but thought the cavity should be properly shaped for them. A tooth may be filled with one cylinder, and half the filling may be cut away, and yet the remaining portion will remain as perfect as ever. If, however, the filling has been made with pellets, he thought it would not be so, but that each pellet would come away itself, the adhesion of gold not being so perfect as when cylinders are used.

Dr. Kingsbury stated that he used gold foil in four different forms. One method was to fold it upon itself, forming squares of many thicknesses, and of various sizes, from two to six lines in breadth. He also formed it into pellets of different sizes; also used a good deal in the rope form, cutting an ordinary sheet of No. 4 or 5 gold foil into from two to eight strips or ribbons, and forming ropes of different thickness. For filling large cavities he twisted entire sheets into the rope form, and then cut it with scissors into short pieces of four to eight lines in length. He almost invariably used gold prepared in this way for filling large cavities;

and, incredible as it might seem to the uninitiated, he sometimes used more than an eighth of an ounce in a single tooth. For filling fangs, his method is to cut a sheet of gold into five or six strips, and then to cut these strips into triangular pieces, and roll them upon a watch-maker's fine steel brooch. With one or the other of these forms of gold he was able to meet the demands of almost any case that might occur. He always used plugging instruments with serrated points. In filling such a cavity as represented by the diagram drawn by Dr. Flagg, he would first use pellets, and having obtained a base of well secured and condensed gold, would then use the short sections of the rope form, made from whole sheets of foil, introducing and condensing one piece at a time until the cavity was filled; not forgetting that the margins of the filling—particularly that bordering on the gum—demanded special attention. He would then file and burnish, using finely-powdered emory with a stick of soft wood to rub down the plug, and finish with the burnisher.

Dr. Buckingham spoke of the importance of having a filling so that it would cleanse itself in masticating; he therefore advocated making wide separations, and was not in favor of cutting out the crown where the decay was on the approximal surface so as to fill without much separating, but preferred having a V-shaped space between the teeth so as to prevent their touching. Teeth that are filled, and left so that they touch each other, are almost certain to decay again; he thought that this was not only the case in molars and bicuspids, but it also held good in the incisors; which are often wedged apart to enable the operator to fill them without filing. He did not object to separating teeth with wedges, but was in favor of filing them afterward, so that the fillings would not touch each other. It was not always necessary to make the space a large one, but there always should be space enough to allow the fillings to be cleansed easily.

He then spoke of decay being caused by the decomposition of food in the fluids of the mouth when held in contact with them, and referred to the fact that decay in the incisor and bicuspid teeth usually commenced between where the approximal surfaces touch each other, and the gum. Now if these teeth are pressed apart, and filled so as to give them their original shape, and then allowed to come together again, the food will lodge in the same place it originally did, and as the dentine and enamel around the edge of the filling is deprived, in a great measure, if not altogether, of its vitality, decay will be very likely to commence at the same point again.

Dr. Garretson presented to the notice of the Association an interesting case in his practice, where the teeth of a young lady, that formerly were good, were now decaying very rapidly, the result of constitutional causes.

The following was chosen as the subject for next discussion:

"THE PREPARATION AND FILLING OF APPROXIMAL CAVITIES IN THE SUPERIOR INCISORS AND CANINES."

EDITORIAL.

REVIEW OF PRACTICAL HINTS, BY ABR. ROBERTSON, D.D.S., M.D., OF WHEELING, VA.

A long article with this heading appears in the present number of the Dental Cosmos, on extracting teeth, reviewing "Practical Hints," from our *friend* above named, about the details of which we have nothing special to say, as it is windy and wordy. Besides, we do not intend to rewrite articles, practical hints, or others: it costs too much time to write them once; and as we have said in Practical Hints, "nor will our preference for it prevent us from adopting a better way if it be suggested by any one in our profession." That, in itself, should be sufficient to show that we do not seek more than a comparison of ideas or practices with any one in the profession. Nor do we expect to defend what we have written: "what is writ is writ," and if any one is instructed by it, he is benefited, and our object is attained; those who are not instructed, are surely not injured, as we do not believe there are any in the profession who are foolish enough to adopt that which they know to be wrong. But we have a word to say on the *morale* of the subject: in the first place, to find fault is not a good way for a scientific man to show his learning, nor is it the most profitable method for a learner to acquire a new idea. We have said we write to expose our own views and practices, not to object to another's practice; when we say so, it is final. The cases referred to by us have been reported correctly, and the success claimed for them true, and we believed the time had long since passed away for any respectable writer to doubt the record of another; it would have been better for the Doctor to have given at least another, if not a better, way to have accomplished the same object. What sense is there in a writer asserting that he does not wish to enter into an argument and does all he can to make one; or pass compliments, and then to make the greatest effort to prove that the party referred to practices upon false and injurious principles; or to attempt to show that a thing is wrong which he has never tried? We do not regard the blunders of a quack doctor attempting to treat a case of cancer as militating against the success of our cases, or the soundness of the practice we have adopted. An operator who does not know the difference between a cancer and the cases we have described, had better not use sharp tools. The Doctor seems to put great stress upon what he "*thinks*," but we are not in the habit of writing what we think, but what we know. When special or anomalous cases are given, it is not usual to give them a general signification. We have read the article the Doctor refers to in the *New York Dental Journal*, and we believe we were not much instructed by it, or we should have adopted it in the kind of cases we reported. Nor are we in the habit of meeting with the dire consequences in the use of arsenical paste which seems to have appeared so vividly to the Doctor's imagination; we are acquainted with the use of arsenic and the anatomy of the teeth and gums, even if we do happen to live in a *metropolis*. J. D. W.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

MUSCLES CONCERNED IN THE DEPRESSION OF THE LOWER JAW.—In an interesting paper, by DR. T. H. BURRAS, of New York, on "Mastication and Articulation of Artificial Dentures," presented in the DENTAL COSMOS and the *Vulcanite* for September, he says:—

> "The only muscle that acts as a depressor of the jaw is the digastricus. The origin, insertion, direction and pulley-like attachments are beautifully adapted for the performance of this office. It arises from the root of the mastoid process and os hyoides and is inserted into the lower and anterior portions of the chin. Its use is to draw the jaw downward and assist in deglutition."

An extended study of the movements of the lower jaw, prosecuted for years in various directions, having led us to very different conclusions from the positions maintained in the above paragraph, we feel impelled, with all due respect to the writer, to present the reasons which induce us to differ with him.

In the prosecution of these investigations we have found, in careful dissections of the muscles of the neck, and then manipulating upon the cadaver to discover the function of each muscle, combined with a close observation of the play of the muscles in thin living subjects during mastication and deglutition, or when a patient, seated in the chair of the dentist, is compelled to make a decided effort to overcome the constant inclination on the part of the *temporal*, *masseter*, and *pterygoid* muscles to close the jaws, that excellent opportunities are afforded for determining the part the *digastric* and other muscles perform in the depression of the lower jaw; we say other muscles, from a conviction that the *mylo-hyoid* and *genio-hyoid* are quite as essential in that act as the *digastric*.

All of these muscles indeed, to our apprehension, serve either as depressors of the lower jaw or elevators of the os hyoides, according as one or the other bone is made a fixed point.

Properly speaking, however, the muscles concerned in the depression of the lower jaw may be classified under two heads, the *direct* and *indirect;* those named above belonging to the first class, and the *omo-hyoid* and the *sterno-hyoid* muscles, which connect the os hyoides with the sternum, to the second class.

The exact part which the different sections of this chain of muscles plays can be clearly and distinctly observed by requesting a patient to open the mouth slightly. Under such circumstance, placing a finger on the os hyoides, not the slightest change can be perceived in the position of that bone; after this, on requesting the person to open the mouth as wide as possible, the os hyoides can be felt moving quite sensibly under the finger, a distance of a half to an entire inch nearer the *sternum*. In the first instance, the depression is due to the contraction of the *mylo-hyoid*, the *genio-hyoid*, and the *digastric* muscles.

A brief reference to the origin and insertion of these muscles may not be out of place, as this alone most conclusively demonstrates their action.

The *mylo-hyoid*, arising from the mylo-hyoidean ridge of the lower jaw, is inserted into the body of the os hyoides, and unites with its fellow of the opposite side by a tendinous connection.

The *genio-hyoid*, arising from the posterior tubercle of the lower jaw, is inserted into the body of the os hyoides.

The *digastric*, arising from the fossa of the same name in the mastoid process of the temporal bone, passes forward in a curvilinea direction, perforates the *stylo-hyoid muscle*, and is inserted into the posterior tubercle of the lower jaw. It is fleshy at the extremities and tendinous in the centre where it perforates the *stylo-hyoid muscle*.

In addition to assisting the muscles named in depressing the lower jaw or elevating the os hyoides, according as the one or the other is made a fixed point, the *digastric* opens the mouth even when the lower jaw is fixed.

In the effort to open the jaw as wide as possible, the depression is due to the contraction of the *sterno-hyoid* and the *omo-hyoid* muscles.

Reference having been made to the muscles connecting the lower jaw and the os hyoides, it may not be amiss to direct attention in the same manner to the origin and insertion of those connecting the latter bone with the sternum.

The *sterno-hyoid*, arising from the sternum, clavicle, and cartilage of the first rib, passes upward to be inserted into the inferior edge of the os hyoides.

The *omo-hyoid*, arising from the scapula near the coracoid notch, passes upward in a curvilinear direction, under the *sterno-mastoid*, to be inserted into the base of the os hyoides.

In conclusion, while thus freely presenting our own views, we feel bound, in justice to Dr. Burras, to state that he has to a certain extent the authority of Todd and Bowman, the eminent physiologists, in the position maintained by him. They say "the depression of the jaw in mastication seems to be performed solely by the digastric; and it may be conjectured that even this muscle acts chiefly by its anterior belly." In speaking of it, however, they merely view it in connection with the act of mastication.

HOW HUNTER WORKED.—In presenting the following list, from the *Dental Review*, of the works of John Hunter, those who fully appreciate how much his efforts have aided them, when taking into consideration that, according to the statements of his biographers, "he remained comparatively uneducated until he arrived at an age when he felt the importance of knowledge, and became ashamed of his idleness," and that "his contemporaries regarded him as a man far inferior to his brother William in general attainments and intelligence," must feel additional interest and admiration for him in thus overcoming what would have constituted, in such a work, with the vast majority of persons, insurmountable difficulty, viz., ordinary powers of mind and a defective primary education. It is reasonable to infer, however, that his contemporaries were mistaken in their estimate of his powers. They no doubt formed this opinion from intercourse and conversation with him, and it is probable that frequently when deeply interested in some anatomical, physiological, or pathological question, he may have been in their company, and feeling little or no interest in the subject of conversation that engaged their attention, may have played a very indifferent part on account of a preoccupied mind. Be that as it may, the amount of work accomplished by him is truly wonderful, and proves most conclusively that he had application and industry in an eminent degree, and worked in the direction he did because he loved it, and could not have helped doing so if he had tried.

"Hunter, at his death, left nine folio volumes of Dissections of Animals. These were copied by Mr. Clift, and are now published in the second of Professor Owen's volumes. This extraordinary accumulation of 'Observations on Comparative Anatomy,' as they are called in the table of contents, covers no less than 490 pages. It includes dissections of almost every type of animal, from the highest vertebrate to the Tubipora musica. A superficial glance at these memoranda gives, as it were, a great deal of the secret history of the great Museum. Throughout are traces of the incessant purchases made by Hunter of everything curious or useful that came in his way. We get glimpses of his associates and fellow-workers, and have laid open to us the sources of the supply of his collection. Lord Shelburn, then prime minister, sends him a large black monkey of the spider kind, of which the cranium, the kidney, the tongue, larynx, and the external ear still remain. Dr. Afzelius, a pupil of Linnæus, brings him home from Sierra Leone a young chimpanzee. He made preparations of the various parts of this creature, but, as its structure had already been described by another anatomist, he appears not to have recorded the results of his own dissection. One day he receives the following note: 'If you will step in at Bank's, in Soho Square, you will find the corpse of the fine Sierra Leone cat, the inside of which is at your service. The skin is to be stuffed for the British Museum.' On another, some one at the Tower sends him a brownish dun cat, something like the shargoss; and then he goes to Mr. Brookes's, a dealer in rare animals, and father of the lecturer Joshua Brookes, to see a civet cat dissected, and comes away with a short memorandum about the direction of the opening of the pupil, satisfied that the anatomy was similar to that of the common cat. Again, there arrives two young hyænas from Gibraltar, with a note of introduction, assuring him, 'You need not be afraid of them; for, in spite of what authors say, they are as tame as puppies.' Nevertheless, they fought together and died, were injected and dissected. Jenner, one of his house pupils—the Jenner—sends him a young whale from Gloucester, and he gets an old black bear that had lost its teeth, from a Mr. Gough, a dealer in animals on Holborn Hill. The Duke of Portland supplies a pigmy musk deer, of which he preserves the skeleton, now No. 3499 in the osteological series. Dr. Solander presents a white bear from Norway, Mr. Banks a questionable creature from Africa with the sobriquet of 'Nick,' and Mr. Clarke, probably the founder of Exeter Change, gives credit for a spotted cavy. He is puzzled about the copulation of beavers, and hunts up specimens that he may inject the penis, and so produce artificial erection. He finds time to dissect a Portuguese bittern, which, he says, 'I shot when crossing the Tagus,' and he makes a marginal drawing in his note-book, to show some peculiarity of the stomach. Even this organ, picked up by the wayside, is taken care of, and years after gets set up in the Museum. In 1764 he buys a crocodile, which had been in a show for several years in London before it died, and takes care to send for Hewson to see it anatomized, and to hear an account of a previous dissection. The intention of this was that Hewson might see that 'I had a tolerable description of the absorbents in the Amphibia, because I found him busy in the pursuit of this system in various animals, and hinting himself to be the discoverer of it even in birds, and to convince him that this description must have been written some considerable time before. Mr. Hewson at the time appeared satisfied, or, at least, made no remarks.' An antelope comes from the Queen, and royalizes the question."—(*Medical Times and Gazette.*)

As additional evidence of the indefatigable application of this eminent observer, we present the following anecdote:—

"On a young gentleman from the country being introduced to him as one who had come to town to pursue his studies under his direction, he addressed him thus: 'Well, young gentleman, so you are come to town to be a surgeon; and how long do you intend to stay?' 'One year,' was the reply. 'Then,' said Hunter, 'I'll tell you what, that won't do; I've been here a great many years, and have worked hard, and yet I don't know the principles of the art.' After some further conversation, the student was directed to call again in an hour, to accompany the surgeon to the hospital, where, after the business of the morning was over, he said to him: 'Come to me to-morrow morning, young gentleman, and I will put you further in the way of things; come early in the morning, as soon after four as you can.' The young man kept the appointment, and at that early hour in the morning he found Hunter at work dissecting beetles!

"Here we have the secret of John Hunter's success, and of every other man's success who has attained great distinction in any art or science.

"History tells us that 'his leisure hours were never allowed to remain unemployed.' He had a very different estimate of the amount to be learned, and the time and industry necessary for its accomplishment, from most people either of that or the present day."

HULLIHEN'S SCRIPTURAL EXPLANATION OF THE CAUSE OF DENTAL CARIES.—The following anecdote, taken from the Biography and Memorial of the late DR. S. P. HULLIHEN, of Wheeling, Virginia, has not received what it deserves—a general circulation among the profession: "Hullihen had encountered some ungrateful cases that were not a little trying to his patience, when he was applied to by a country gentleman of the pulpit, with very miserable teeth—one indeed who had only a sad array of decayed fangs. This patient expressed great wonder as to the cause of diseased teeth and their loss, when life was scarce half over; 'it was unnatural: it could never have been the design of Providence!' and he wished the Doctor would explain the mystery. The general causes that lead to decay and loss of teeth were very carefully gone over by the Doctor, and the visitor, with a mind apparently enlightened and satisfied, left the office; but in a day or so the same gentleman returned, and again he wanted the Doctor to tell him *why* it was that teeth decayed; why *he* should be thus sorely afflicted so early in life. A little impatient at the evident inattention to his previous explanation, the Doctor now said: 'Well, sir, I very recently gave you a *professional* view of the causes of decay in teeth, which you seem not to have understood, so I will now give you a *scriptural* explanation of that misfortune, which you will understand. You are, of course, conversant with the scriptural history of the forbidden fruit, and the sin of our first parents; you must perceive that when Adam and Eve ate the apple, they bit it with their teeth; of course, then, the teeth being the immediate instruments of sinful disobedience, it was right that they should be the greatest sufferers for the offense. Therefore, we may conclude that whenever a man has very bad teeth early in life, there is an unusual amount of old Adam in his nature!'"

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DENTAL REGISTER OF THE WEST—AUGUST.

THE AMALGAM QUESTION.—(Continued from page 102.)—"Bearing these points in mind, let us apply them to amalgam plugs in the mouth.

"We have seen that the constituents of the saliva act with unequal energy on the metals considered; and, as they are in the saliva, and in contact, it follows that galvanic action must ensue. And if there is such action at all, in this case, it must result in the formation of an almost infinite series of minute circles, similar to those formed by immersing commercial zinc in a dilute acid. And as the decomposing power of galvanic circles varies inversely as the square root of the distance between the excited surfaces, actual or apparent contact gives a battery of great power. And it should be borne in mind that the exciting solution of a galvanic battery is itself decomposed, or rather some binary compound in it must undergo decomposition. The saliva, then, acting on one of these metals, or unequally on more than one of them, galvanic action is established, and this being so, it follows that some binary compound of the saliva is decomposed. And if the currents have sufficient force, all its binary compounds will be thus decomposed. Water, hydrosulphuric acid, and the soluble chlorides would thus readily undergo decomposition. It follows from this, that the formation of the oxides and sulphurets, referred to above, is promoted by the galvanic action thus established.

"But even to this there is a limit. The oxides and sulphurets thus formed, being nearly insoluble in ordinary saliva, and being deposited on the surfaces of the metals, protect the latter from the action of the former, and thus by arresting, to a good degree, the chemical, arrest with it the galvanic action. This will be better understood by a brief consideration of the ordinary zinc and copper battery. A sheet of zinc and one of copper, connected by a wire, if plunged into water, immediately establish a galvanic current. But this current is soon arrested; for the oxide of zinc, formed on the surface of the zinc plate, is insoluble in the water, and, therefore, the metal is protected from further action. But if a little sulphuric acid be added to the water, it dissolves the oxide, as fast as formed, and the zinc continues to decompose the water, and the galvanic current is kept up.

"It is only on account of this insolubility of the black oxide and sulphuret of mercury, thus formed, that we see so few cases of the constitutional effects of the metal, resulting from amalgam fillings; for if they were as soluble as the chloride, a single plug of ordinary size could scarcely fail to produce these effects. If this position be correct, it follows that if it is proper at all to use amalgam fillings, it is no cause for discouragement to see them turn black. On the other hand, it is rather fortunate that they do blacken. And this corresponds exactly with our own observation on the subject, which has been *very extensive*, and embraces a period of more than a dozen years. We do not now recollect a single case of constitutional disturbance resulting from the presence of amalgam fillings, in which the blackening of the plugs was very decided; and in the last three cases that we observed, there was none at all.

"Genuine chemical combination takes place in the formation of amalgams. This is evidenced by various phenomena that may be observed. When an attempt is made to combine two metals, differing considerably in their affinities for non-metallic elements, one of them, as soon as contact is made, necessarily becomes positive, and the other negative. For example, in making an amalgam of gold, the mercury is rendered positive, and its affinity for oxygen, a highly electro-negative element, is thereby greatly increased. The consequence is that the black oxide of mercury is abundantly formed. The same thing takes place, though to a less extent, in making amalgams of tin and silver. We have met with many who regard the presence of this black oxide as an evidence that the mercury is not pure. It is formed, however, when the metals are all pure. If this oxide is put in a tooth cavity, along with the amalgam, of course the plug will not make as good an appearance as when it is removed by washing with alcohol, water, or a solution of common salt. And when the oxide is thus washed away, there is less danger of constitutional disturbance than when it is allowed to remain; for, in most mouths, after the amalgam is inserted, the sulphuret of mercury will be formed in greater abundance than the oxide, and it is well known that the latter is a more active poison than the former. And besides its greater activity, in contact with hydrochloric acid, which is presented in many mouths, it is readily decomposed, the reaction yielding water and the subchloride of mercury, or calomel. It is well known that calomel is a still more active preparation of mercury than the suboxide.

"But, as the fluids of the mouth cannot act unequally on the metals under consideration without exciting galvanic action, it will be understood by all who remember the presence of soluble chlorides in the saliva, that the formation of the subchloride, or even the chloride of mercury, is not improbable. The chlorides of sodium and potassium, being binary compounds, and soluble, are readily decomposed by galvanic action. The chlorine, thus liberated, will unite with the mercury, just as the liberated oxygen unites with the zinc of the ordinary battery. As these chlorides are present in normal saliva, there is nothing remarkable in the formation of chloride of mercury from amalgam plugs; and it is probable that in all cases of constitutional effects arising from their presence, either the subchloride or the chloride is the agent that produces them. Were it not that the breaths of most patients as well as their saliva are loaded with hydrosulphuric acid, so that the insoluble black sulphuret is formed, the formation of at least one of the chlorides of mercury could scarcely be prevented. W."

DENTAL REVIEW, LONDON—JULY.

SYMPATHETIC IRRITATION.—The communication presented below is the conclusion of an interesting paper read before the College of Dentists at the monthly meeting, held May 7th, 1861, by H. T. KEMPTON, M.C.D., Eng., F.T.S.

There is no subject connected with the practice of dentistry that is more deserving of patient and thorough investigation than this; and none that offers a broader field of observation, or of extended usefulness.

The cases described are all interesting and instructive, and have such a direct and decided bearing upon the points under consideration that they are not only worthy of careful perusal, but also of being indelibly impressed upon the mind as valuable aid in diagnosing obscure cases which may be presented in the course of practice.

"Dr. Ashburner, in the work already referred to, has recorded an instance in which the derangement was such as to threaten insanity.

"CASE 2.—'A young gentleman, of light hair and eyes, of a strumous temperament, seventeen years of age, had a faint and very peculiar odor of breath. His mind was excited by several harassing considerations, and he was attacked by delirium. Violent conduct, and a desire to destroy numerous objects that came in his way, were the manifestations of aberrant intellect. In other respects his spirits were extremely high, and he was full of fun and joyousness; but the uncontrollable desire of mischief rendered it advisable to put him under restraint. One of the most experienced physicians of the metropolis decided upon the hopelessness of a cure in this case; and the opinion was founded upon a range of facts with which it falls to the lot of very few to be conversant.

"'I one day persuaded this patient to allow me to use my gum lancet freely upon some larger spaces of gum covering developing dentes sapientiæ. In a week afterward I heard that he was quite well.'

"What was threatened in the previous case actually occurred in the following, which was related by Esquirol to Dr. Toirac.

"CASE 3.—'An insane lady was brought to Esquirol's establishment, who recovered her reason after a crucial incision had been made on the gum to allow the development of the wisdom tooth.'

"The two following cases are recorded by the celebrated American physician, Dr. Rush.

"CASE 4.—'Some time in the month of October, 1801, I attended Miss O. C., with rheumatism in her hip-joint, which yielded for awhile to the several remedies for that disease. In the month of November it returned with great violence, accompanied with a severe toothache. Suspecting the rheumatic affection was excited by the pain in her tooth, I directed it to be extracted. The rheumatism immediately left her hip, and she recovered in a few days. She has continued ever since to be free from it.'

"Case 5.—'Some time in the year 1801, I was consulted by the father of a young gentleman in Baltimore who had been affected with epilepsy. I inquired into the state of his teeth, and was informed that several of them in his upper jaw were very much decayed. I directed them to be extracted, and advised him afterward to lose a few ounces of blood at any time when he felt the premonitory symptoms of a recurrence of his fits. He followed my advice; in consequence of which I had lately the pleasure of hearing from his brother that he was perfectly cured.'

"Mr. Tomes, in his recent work on Dental Surgery, has recorded a similar case.

"Case 6.—'A lad, a farm-laborer, from Windsor, was admitted into the hospital for epilepsy. The usual remedies were tried for six weeks without effect. His mouth was then examined, and the molar teeth of the lower jaw were found to be much decayed; and of some of these the fangs only remained. He did not complain of pain in the diseased teeth or in the jaw. The decayed teeth were, however, removed, and the fangs of each were found to be enlarged and bulbous from exostosis. During the eighteen months that succeeded the removal of the diseased teeth, he had not suffered from a single fit, though for many weeks previous to the operation he had two or three a day. The boy was free from any other disease.'

"Some short time back, the following example of nervous irritation, extending to the whole side of the body on which the diseased tooth was situated, occurred in a patient of my own.

"Case 7.—'The Rev. H. K. had been troubled for some months previous to my seeing him with pain on the left side of the head and face. The intensity of the pain varied, sometimes being exceedingly acute, and accompanied with considerable swelling of the face. These pains appeared to commence in the canine tooth on the left side of the upper jaw; not only did they extend over the whole of that side of the head and face, but they were accompanied with a sensation of numbness in the arm and leg on the same side of the body. The canine tooth was very much worn away on the crown by the action of the lower teeth in mastication, but in other respects it appeared to be a perfectly healthy tooth. As the pains had already continued for some months, and there did not seem any probability of their ceasing, I extracted the canine. The operation was perfectly successful; and the patient has not only remained free from pain, but has lost all sensation of numbness in the arm and leg. The tooth was very firmly adherent to the socket, so much so that some of it came away with the tooth when it was extracted, and even out of the mouth could only be removed from the surface of the fang by the use of considerable force. Upon examining the fang, I found a considerable bulging on one side arising from exostosis, and I feel no doubt that this was the source of the nervous affection from which the patient had now been suffering for some months.'

"Dr. Richardson has given a well-marked instance of hysteria dependent upon the presence of a carious tooth.*

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* *The Medical History and Treatment of Diseases of the Teeth*, by B. W. Richardson, M.A., M.D., p. 86. London, 1860.

CASE 8.—'A lady was engaged in preparing a ball-room for visitors in the evening. She had been some days before in indifferent health, with tendency to hysterical paroxysm. In the midst of her occupation she suddenly uttered a piercing cry, and in an instant was frantic with agony. There was no mistaking the fact of suffering, for every limb shuddered, and cold sweat bedewed the cold face, which was distorted with pain. In the intensity of her anxiety, she tore up everything in her way, and neither reason nor persuasion could for a moment influence the frantic expression of a torture which seemed unendurable. The seat of the pain was a carious tooth in the upper jaw, the first molar, a tooth which for a long time past had given no anxiety or trouble. From this point the pain seemed to extend all over the body, but in the tooth it was concentrated. On the application of chloroform to the cavity of the tooth, the pain as suddenly ceased, leaving the patient as free from pain as at any previous period. Afterward, however, for the succeeding one or two weeks, there were occasional smart returns of the ache, with equally rapid subsidence on the application of a narcotic.'

In these cases there was positive disease in the teeth; but in the following, which was published in the *Lancet* of 1859, by Mr. Hancock, with some other cases to which I shall presently refer, there was no apparent disease whatever of the teeth, but simply want of room.

CASE 9.—'A gentleman, aged thirty, was sent to me for lock-jaw and pain under the right ear. He could only separate his jaws for about half an inch in front, and had been in that state for nearly twelve months. He attributed the mischief to cold, and had been subjected to various kinds of treatment, including leeching, blistering, etc., without benefit. Upon careful examination, I observed that his teeth were much crowded and wedged closely together, particularly in the upper jaw, and concluded that to be the cause of suffering. I accordingly requested Mr. Alfred Canton to see him with me. He extracted one of the anterior molar teeth from the upper jaw. The tooth was very large, but perfectly sound, and the patient returned home in the course of a week cured.'

The last case which I shall mention in connection with this division of my subject is one of partial paralysis.

CASE 10.—'A French gentleman, about nineteen years of age, of a florid complexion, and of a remarkably healthy appearance, had been for some time affected with a slight degree of loss of power in the right arm, with occasional pain, of that peculiar tingling kind which is produced by pressure upon a nerve. At length he observed that an accession of one of these attacks was accompanied with an acute pain in the second molar tooth in the lower jaw on the same side. This led to a more attentive observation of subsequent recurrences of the pain, and he found that whenever the tooth was pressed or irritated, the sensation in the arm returned. The tooth was extracted, and the complaint, though not immediately, was permanently cured.'*

These examples might easily be multiplied, but sufficient have been brought forward to show that abnormal development or disease of the teeth may set up nervous irritation, which will meet with a sympathetic response in the sensorium itself, or become propagated through the medium of the sensorium to other and remote parts of the body, along the course of nervous trunks, which, on a superficial examination, appear to be totally unconnected with the dental nerves. I proceed next to speak of some similar effects produced by the teeth upon the organs of vision and hearing: first, of those of vision

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* *The Anatomy, Physiology, and Diseases of the Teeth*, by Thomas Bell, F.R.C.S., p. 324, 2d edit.

In the *Dublin Medical Free Press* the following case is recorded:—

CASE 11.—'A man consulted Dr. Emmeuch for a painful affection of one of his eyes, which had lasted fourteen years. There were considerable vascularity of the parts, a continual flow of tears, with pain and intolerance of light. All these symptoms were greatly aggravated by any indiscretion in diet, and the use of the slightest stimulus, such as a single glass of wine. All kinds of remedies had been tried in vain at different times, and the affection seemed incurable. On examination of the upper jaw, Dr. E. found a carious tooth on the side corresponding to that of the affected eye. The tooth was extracted, and almost immediately afterward the symptoms relating to the eye began to subside, and soon entirely disappeared.'

Mr. Henry has kindly favored me with a translation from the German of some observations made by Dr. Tierlinck, in the 'Transactions of the Medical Society of Ghent;' but only two of these cases bear immediately upon the present subject, most of them consisting of instances in which the eye became affected through the inflammation which either accompanied diseased teeth, or followed their extraction. The two following, however, are instances of purely sympathetic affections arising from irritation of the nerve.

CASE 12.—'A young man suffering with violent toothache, had the first upper bicuspid extracted. The operation was very simple, ~~and~~ the tooth was perfectly removed; but the patient asserted that he experienced violent pain in the eye of the same side, and on the following day he went anxiously to his medical adviser, assuring him that the sight of it was affected. On examination, it was discovered that the pupil was very much dilated, but this was the only diagnostic sign evident. A card punctured with a needle was held before the eye of the patient, which immediately enabled him to distinguish surrounding objects, thus showing ~~that~~ there was merely preternatural dilatation of the pupil, without structural change, admitting too many rays of light, and thus hindering the appreciation of objects. Pledgets of lint, saturated with extract of opium, placed in the alveolus, and an opiate ointment applied to the cheek, sufficed to remove the dilatation of the pupil and restore the sight.'

CASE 13.—'A lady was suffering from defective vision. By one adviser it had been set down as cataract, by another it was attributed to intermittent ophthalmia, and a third regarded it as amaurosis. Dr. Tierlink, after giving his opinion as to the judgment of these gentlemen being erroneous, examined the mouth, and expressed his belief that the cause of her complaint originated in a carious stump, which had been a source of irritation to the fifth nerve. The stump was extracted, giving instant relief from pain; the flow of tears subsided, and the sight was gradually restored.'

Mr. Hancock has recorded three cases in the *Lancet* for January 23d, 1859, in which the affection of the eye originated in diseased teeth.

CASE 14.—'J. K., aged eleven, was admitted into Charing-Cross Hospital, November 11th, 1854. About a month previously, upon waking one morning, he found he was entirely blind. Previously he had nothing the matter with the eyes, and when he went to bed on the preceding night could see distinctly. He consulted a surgeon in the country, who prescribed medicines, blisters, and subsequently cupping; but as he did not derive benefit therefrom, he was, at the expiration of a month, sent to the hospital. The pupils were dilated, fixed, and uninfluenced by light, which he could not distinguish from darkness. The suddenness of the attack, and the absence of the usual premonitory symptoms, led Mr. Hancock to conclude that the mischief was functional rather than structural, and he therefore examined the teeth. These organs were found to be much crowded and wedged together—the jaws, in fact, not being sufficiently large for them. On the seventeenth November, two permanent and four milk molar teeth were extracted. On the same evening the boy could distinguish light from darkness, and on the following morning could make out objects. From this time his sight rapidly improved, and he was dismissed cured on the twenty-eighth, the only treatment beyond the removal of the teeth being two doses of aperient medicine.'

"In the following case the amaurosis had lasted for six or eight months, and the patient had been subjected to the usual treatment for that disease.

"CASE 15.—'A man applied at the Royal Westminster Ophthalmic Hospital, for total blindness of the right eye of eight months' duration. The attack came on quite suddenly, not having been preceded by pain, muscæ, flashes of fire, or any of the usual precursors of amaurosis. He could distinguish light from darkness; the pupil was dilated and fixed. The various remedies for amaurosis had already been employed in the country without success. On examining the mouth, the second molar in the right upper jaw was found to be much decayed. This was extracted, and the patient desired to attend at the hospital in two days. At his next visit, he could see, and was able to distinguish objects, though not very clearly. In the course of a few days, he returned to the country well. He had no other treatment beyond the extraction of the tooth.'

"The next case was one of strabismus, with falling of the upper eyelid.

"CASE 16.—'H. R., aged twenty-nine, a native of Hereford, was admitted into the Westminster Ophthalmic Hospital on July 3d, 1858. The strabismus had existed for three years. The ptosis was of recent date—about a fortnight's duration. The left eye was quite closed. The mischief came on suddenly, without pain either in the head or eye. The patient was ordered compound iron mixture, one ounce thrice daily, with an aperient occasionally at bedtime. This was continued until July 12th, when she was no better. The mouth was examined, and two molar teeth on the left side of the upper jaw were found decayed. The patient declared that they caused her no pain; but they were ordered to be extracted, which was done. Two days after the ptosis was much better, and in two days more it had assumed an intermittent character. The eye was quite open in the morning, but toward noon the lid drooped and did not resume its proper position until the evening. The patient was ordered five grains of sulphate of quinine twice a day. In four days more, the ptosis was cured, the strabismus better, and so slight as not to require an operation. The patient remained in the house three or four weeks longer, when she was discharged cured.'

(To be continued.)

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Lecture on Dentition and its Derangements. By A. JACOBI, M.D., Professor of Infantile Pathology and Therapeutics in the New York Medical College.

"That a large number of infants cut their teeth without any bad symptoms, has never been denied. Instead, however, of considering these cases as natural, they have been taken as exceptions; instead of looking for the causes of diseases in the age of the patient, and its various morbid dispositions in its constitution, or in direct injuries, both authors and the public have seemed to rest satisfied in the belief that the more an infant was disturbed with abnormal functions, the nearer came dentition to its natural standard. But all the symptoms observed during or before the protrusion of teeth do not come within the range of morbid affections; I have already spoken of some of the symptoms indicating the approximation of, or attending, the progress of dentition; I therefore shall not dwell upon them, but shall briefly enumerate such as are generally attributed to the protrusion of teeth. I may state that many explanations which would be here required, will naturally follow a physiological sketch of early infantile age, which I intend to give you in a future lecture.

"The general irritability of the nervous system in teething children is said to be increased. They are restless, sleepless, will suddenly awake from a short slumber, are peevish and cross, change their color frequently, and often urinate. I am certainly unwilling to deny the frequent occurrence of these symptoms in teething infants, but will take the liberty of stating that in early infancy nervous symptoms are of frequent occurrence; that even the weight of the organs of the nervous system is greater in proportion than at any other period of human life, and its action may be supposed to be more powerful, and perhaps irregular; and that the very same symptoms attributed to teething are really being observed in almost all the affections occurring at this age. Both functional disorders and diseases are the more frequent the younger the individual; this is a fact clearly shown by all the statistics of both private and hospital practice, relating to both diseases, and the rate of mortality in this early period of life.

"The local irritability produced by the process of dentition has often been noticed, and alluded to as a proof that there is something very peculiar and troublesome about this process. The infant is said to put its fingers into its mouth, and introduce anything it can lay hold on; it bites the nipples, and gentle rubbing of the gums causes an agreeable sensation. It is said to rub its lips, nose, and eyes, and to move the occiput on the pillow, especially at the time of the protrusion of the incisors of the upper jaw.

"Such are said to be the local symptoms of either approaching or present dentition; the latter term always being made use of to signify the final protrusion of the teeth. Is it remarkable that an infant will put its fingers into the mouth at this protracted period of teething, viz., from the fifth or sixth to the thirtieth month, when it has done so from birth?

The very fact of the peculiar position of the fœtus in the uterus, the prominence of the action of the flexor over the extensor muscles, appear to be among the first causes of the new-born child's sucking its fingers. The great sensibility of the cutaneous nerves of the ends of the fingers, and of the lips, which are moreover regularly exercised by the reception of food; the indistinct impression in the infant, after having been nursed a number of times, of the lips and mouth being in some connection with the feeling of satisfaction, are the reasons why the infant sucks its fingers in the few weeks and months following its birth. Whichever explanation is correct, it is a fact that from the hour of birth the infant will either suck its fingers or keep them in the neighborhood of the mouth and nose. Nor is it astonishing that an infant will, during the time of dentition, take everything to its lips and into its mouth, after it has done so all its life. The principal impression an infant obtains depends on its relation to foods and drinks; eating is the only real propensity an infant has, and the mouth is known by experience to be the great receptacle destined for the reception of everything around; not to speak again of the lips being used as a means of touching, grasping, and learning the qualities of things. Everything living learns by experience and experiments, by physical impressions. All the sensory organs will be exercised for the purpose of understanding the impressions on the peripheric nerves, and the sensory organ first freely exercised by an infant is that of palpation. Further, a teething child will often bite the nipple, undoubtedly, but a number will not; and any child with any irritation of the cavity of the mouth, with any form of stomatitis, with any disease in fact which causes a sensation of uneasiness, will do the same. And finally, ought we to attribute the restless movements of the occiput on the pillow to teething, when every child affected with almost any affection of the brain, or its membranes, with hyperæmia of the cranial bones, with cutaneous eruptions of the cranial integuments, and rachitical affection of the bones, will be observed to do the same? Why is it that the protrusion of the upper incisors is often attended with this restlessness, and almost regular moving to and fro of the head on the pillow? It means, that irregularity or anomalies in the protrusion of the upper teeth frequently depend on anomalous development of the upper jaw itself; and that the development of the upper jaw is generally in intimate connection with the development of the cranial bones. Thus you perceive, that when this is abnormal, and the upper jaw suffering accordingly in its general development, that often-mentioned symptom has nothing to do with the protrusion of teeth, as such, but must be referred to a defective or abnormal development of the cranial bones and subsequent anomalies in the structure or function of the brain. Instead, therefore, of pointing to dentition, especially to normal dentition, it indicates some more or less grave disturbance in the constitution or function of either the brain or its membranes, or its cranial or cutaneous integuments.

"There are some objective symptoms announcing the approaching protrusion of teeth, which are of more or less importance. The gums will swell, and become looser and softer; or, which is more common, the alveolar margin will become thick, hard, flat, and prominent. This condition is always perceptible, and nevertheless we are liable to be mistaken as to its signification. I have seen a child, who had this prominence of the thickened alveolar margin over several teeth for a long time, without the teeth making their appearance. In fact, deep incisions had been made into the gum, more than two months before the first incisor cut through. This shows that although the normal process of dentition generally requires the condition of the alveolar margin described above, we are by no means justified in predicting a speedy protrusion of a tooth through the thickened and elevated wall. This prominence of the so-called dental cartilage is often said to be red, livid, and soft. But in healthy infants, and with normal dentition, the contrary is generally the case. The mucous membrane of the mouth, although normal, is generally of a deeper color than the normal appearance of the gums, and frequently, in catarrhal affections of the mucous membrane of the mouth, the difference between its livid and softened velvet-like appearance, and the pale color and solid condition of the gums, is remarkable. Only when the protrusion of a tooth is very imminent, the gum will be in many cases a little sensitive, on being touched or pressed ; and saliva and mucus are said to be secreted in a large quantity at the same time, until the gums become thinner and thinner, and the tooth protrudes.

"Great importance is attached to salivation by the public, as a premonitory symptom of dentition; but it is a fact, that it will sometimes precede the breaking through of a tooth for a number of months, and will not cease after the tooth, or a group of teeth, have made their appearance. It is thought to be caused by the direct irritation of the gums, acting on the mucous membrane of the mouth, and the stenonian ducts, and the salivary glands. It has even been considered to be the cause of a number of accidents occurring during dentition; the saliva and mucus were, in the opinion of a number of medical writers, swallowed, and proved to be the cause of vomiting and diarrhœa, of erosions and aphthous inflammation of the mucous membrane. The truth is, that increased salivation is regularly observed in infantile age, long before, and during the first period of dentition. If, therefore, those authors were right, who believe it to depend on the irritation of the mucous membrane of the mouth, and of the salivary glands, there must be a constant irritation of the gums in every normal dentition. This, however, is not so, according to my preceding remarks. I will simply state now, that the increased secretion of mucus and saliva before this time does not depend on the protruding teeth, but is the result of the salivary glands and mucous follicles undergoing about this time a rapid process of development. We shall have to return to this subject, and have to learn from a physiological sketch of the infantile organism, which I expect to give in this course of lectures, that a number of symptoms apparently affected by each other, and depending on each other, are but inordinate consequences of one and the same common cause. At all events, this will be readily understood by you, that the increased salivation need not be produced by some supposed constant irritation of the gums. At all events, you will not be deceived by the occasional emphatic statement of the following observations, which is meant to show that dentition in normal and robust children will be attended with copious salivation, while sickly and feeble children have no salivation to any amount. This appears to be true, but is not. The observation is imperfect in this, that healthy and robust children of four, six, or eight months, will generally, while awake, be in an upright position, thus dropping a large amount of the secreted mucus and saliva, and being constantly wet with it; while sickly and feeble children of the same age, will, first, be a little backward in their general development, and, moreover, have too little muscular power to allow them any but a supine position.

Thus they will swallow most of the secretion, which more robust children will be constantly wet with.

"I think it but reasonable to infer that if remarkable symptoms are the result of dentition, either normal or abnormal, a large number of anomalies must take place in the immediate neighborhood of the protruding tooth, if not in its own substance. Such affections are found, indeed, and known by the terms of *odontalgia, odontitis,* and *gingivitis;* but they are very rare affections, and the only idiopathic ones which are said to have occurred during, or rather in consequence of dentition.

"Odontalgia, or neuralgia of the dental pulp, the dental nerve, is said to have been observed in teething children. What were the symptoms of this disease of dentition? Patient cried much, kept his fingers in the mouth, caught the breast greedily, and left off just as suddenly, was also constipated, but otherwise healthy, and there was but little injection, and intumescence of the gums. Exactly the same symptoms are reported to attend normal dentition, with the exception perhaps of constipation. But the restlessness of the infant was in connection with this constipation, and it screamed from colic pains? Although we are told by observers that the symptoms would disappear with the protrusion of the very first point of a tooth, the number of cases of this dental disease is so small that we cannot refrain from doubting the correctness of the diagnosis. In olden times, odontalgia from dentition has been observed a number of times; thus Karl Himly has a chapter on the subject; but a more modern author, Hanmann, relates having seen two cases occurring during the protrusion of the molar teeth. Two cases in the lifetime of a medical man, who has met with many thousands of teething children; no pathognomonic symptoms in these very cases to distinguish them from other complaints; no like observations in the practice of hundreds of other practitioners—all this looks rather suspicious, and leads us to infer that this odontalgia depending on dentition, although its occasional occurrence during the protrusion of a tooth may have been observed, is rather doubtful.

"Gingivitis, inflammation of the gums, is also reported to have been observed in the course of dentition. Its symptoms are the very same that have been given as premonitory of normal dentition, and in odontalgia, with the addition of intense injection, swelling, and heat of the gums and the mucous membrane of the mouth and pharynx. We are justified in doubting whether all these cases have been primary gingivitis, or whether or not the affections of the mouth and pharynx have been the primary diseases; the more so when we again are told of the presence of the very same symptoms as above, and moreover learn that the gums will not only tolerate a moderate pressure while inflamed, but the patient feels relieved. That there can be a severe inflammation of the gums, in connection with the protrusion of a tooth, is proved by the difficulty sometimes, though rarely, met with by the protruding wisdom tooth, resulting from insufficient room, etc., but very rare it must be, as the termination in suppuration has been observed by but very few men, and but very seldom altogether. We are the more justified in so presuming, as we know of a number of cases of very severe and general stomatitis without the least affection of the gums, and of others where the gums were immensely swelled without injection, heat, or pain; and as the gums are generally very little apt to be affected by inflammatory action. Ulcerations of the cheeks in the immediate neighborhood, or even anomalous protrusion of teeth, either deciduous or permanent, through the gums and alveolar process, in an oblique direction, are but seldom found to give rise to an inflammatory process in the gums.

"Odontitis, or inflammation of the tooth, is the third local affection sometimes attributed to dentition. Again the same symptoms, pain, injection, swelling, are enumerated, and described as very intense and obstinate. Recovery would not always take place, although it would be the result, after days or weeks, in the majority of cases; but death would sometimes ensue under the symptoms of a thorough affection of the nervous system, or of a 'typhoid fever.' It would often be combined with other diseases, and, according to Schönbein, not unfrequently with rachitis. Jahn has made a number of *post-mortem* examinations in cases of odontitis; and what did he find in such children who died from inflammation of a tooth? Why, hyperæmia of the brain, acute hydrocephalus, 'gastromalacia,' and always violent inflammation of the gums and alveoli, with sometimes a dark-bluish color of the alveolar margin. This latter shows certainly injection, but the former prove those children to have suffered from, and died of, cerebral diseases. The connection of rachitis also points to the slight importance of the local affection, showing that the principal danger has been observed to be derived from constitutional or local ailings, not at all depending on, or connected with, the local process of the protrusion of a tooth. I have to state, finally, that there is no such thing as odontitis proper, the dental tissue being too hard and deprived of vessels for an inflammatory process to take place. What has been called by this name, is either endodontitis, or periodontitis. The former is inflammation of the inner dental pulp richly endowed with nerves and vessels, in which stasis and chemical changes may take place, and intense pain be felt, and central caries brought on. This form will sometimes be observed, but in advanced age, and not rarely in very robust and otherwise healthy men. Periodontitis is inflammation of the periosteum surrounding the root of a tooth, producing a beating pain, especially in the warm temperature of the bed. The tooth appears to be elongated, and feels sore on pressure, until either recovery has taken place or suppuration, which will permit the tooth to be removed without much difficulty. That the gums suffer simultaneously, is but natural. But this affection is also observed, almost exclusively, in adults."—(*Am. Med. Times.*)

Sympathetic Action. The following remarkable cases from one of the admirable lectures of Mr. J. Hilton, "On Pain and the Therapeutic Influence of Rest," in the *Lancet*, strikingly exhibit the correlative influence of the different parts of the animal economy.

"*Furred Tongue on one side caused by a Decayed Tooth on the same side.*—As I purpose making the case of gangrene of the fingers from pressure upon the ulnar nerve the culminating point of a little group of cases bearing upon this subject of physiological rest, or rather the evil resulting from the want of physiological rest to the nerves, I must request your attention to this sketch of a tongue furred on one side, and comparatively clean on the other. I dare say some of you at first sight wondered what this representation could be intended to elucidate, beyond the bare fact of one side being tolerably clean, and the other somewhat furred. Now, this furred condition of the tongue, let me say in anticipation of what I have to speak of more in detail, is frequently associated with a diseased condition of the second division of the fifth nerve; in fact, it is a functional and structural deterioration depending upon nervous influence, in that respect very much resembling what we have already seen in its extreme condition in the case of gangrene of the fingers.

"*Furred Tongue on one side, depending on Disease within the Cranium.*—The first time I had an opportunity of clearing up such a case as this occurred in 1843. On December 17th, 1843, with Mr. Blenkarne, a surgeon in the city, I examined the body of one of his patients, who had died with disease of the brain and spine. She had suffered from intense pain on the left side of the head. She had also, during her life, a furred tongue on the left side, and scarcely at all on the right side. It therefore became an important point to clear up what was the probable cause of that condition of the tongue. We made a *post-mortem* examination, and found a diseased spine, as was anticipated. Then, upon very careful examination of the head, for the especial purpose, on turning up the dura mater from the anterior part of the petrous portion of the left temporal bone, we exposed the Gasserian ganglion, or the ganglion of the fifth nerve, and there we found what might be called a scrofulous deposit upon the convex edge of this ganglion, involving the second division of the fifth nerve more than the third, but still involving all more or less. Here, then, appeared to us to be the explanation of the probable cause of the furred tongue on its left side. This observation was made in 1843; the disease was near the ganglion of the fifth nerve, and on the same side as the furred tongue. If I should not mention that fact again, it will be clearly understood that the diseased condition of the tooth, or of the fifth nerve, was always found on the same side as the furred tongue, and that the fur was confined to the anterior two-thirds of the upper surface of the tongue, over the distribution of the lingual gustatory nerve—a portion of the third division of the fifth.

"In 1844, when delivering some lectures upon the nerves at Guy's Hospital, I mentioned this case, and one other that I had seen before, the cause of which I had not distinctly proved. After the lecture, one of the students said, 'Look at my tongue; it is furred on one side, and I cannot get rid of it.' He had a decayed and painful tooth—the second molar in the upper jaw. That tooth was, by my advice, removed, and after a short time the fur on the tongue entirely ceased. Now here, in this case, appeared to be a demonstration, as far as we could judge from these concurrent circumstances, of the probable cause and effect. Here was a painful and diseased second molar tooth in the upper jaw, on the same side as that on which the tongue was furred, and apparently the cause of that condition; for as soon as the tooth was removed, the fur on the tongue ceased, and the two sides became quickly alike. This case seems to confirm the opinion as to the cause of the unilateral furred tongue; but there is this peculiarity and difficulty in the explanation, which I am anxious to admit,—that instead of the cause being associated with the third division of the fifth, as you might expect from the lingual gustatory nerve supplying that part of the tongue which is furred, in all the cases which I have seen where the cause was connected with the teeth the seat has appeared to be the first or second molar tooth of the upper jaw, (the second division of the fifth nerve,) on the same side as that on which the tongue is furred. I must leave others to explain how that occurs. I am responsible for the accuracy of the facts which I have advanced, but I cannot explain the relation of cause and effect in these instances.

"*Furred Tongue on one Side; Second Molar Tooth of Upper Jaw Diseased.*—This last spring, a lady, whom I have known for some years, consulted me regarding some matters not of importance, and I, perhaps not for any very precise purpose, said, 'Let me look at your tongue.' She put out her tongue, and it was furred on one side. I said, 'You have a bad tooth;' and she thought it was exceedingly clever on my part. 'Yes,' she replied, 'and I am going to Mr. Bell to have it taken out.' She went and had it extracted; I saw her a fortnight afterward, and all the fur had subsided. This was the second molar tooth in the upper jaw of the same side as the furred tongue.

"Very recently my own bootmaker had some little accident, and he came to my house to consult me. I found he had a furred tongue on the right side, and I remarked to him, 'You have a decayed tooth in your upper jaw.' 'No,' he said, 'I have not; but I have had a bad tooth stopped, and it is very painful when I touch it in this way, (pressing his finger upon his cheek over the tooth;) almost the whole of the time since I had my tooth stopped, my tongue has been like this.'

"Now these cases, taken together, and made into a series or small group, seem strongly to suggest the influence of irritation or of pressure upon what we may call common spinal nerves, grouping the fifth nerve as a common spinal nerve, although it has its relation only with the face and the head.

"*Gray Hair on the Temple depending on a Decayed Molar Tooth in the Lower Jaw on the same side.*—This spring a person was brought to me, by a surgeon, suffering very great pain on the left side of his face. He was much exposed to the weather, and he suffered a great deal in consequence. He had taken many things to cure the neuralgia, as it was termed. I observed that he wore a wig, and I asked him the reason. He said, 'Curiously enough, the hair on my left temple has all turned gray. I did not like to have black hair on one side and gray on the other, so I had my head shaved, and wear a wig.' Upon examining his mouth I found he had a decayed and painful molar tooth on the left side of the lower jaw —the third division of the fifth nerve. The patch of gray hair appeared to me to be the effect of the nervous association of the temporal branches of the third division of the fifth nerve and the decayed tooth in the lower jaw. When this second molar tooth in the lower jaw was extracted the neuralgic pain very nearly ceased. I have not seen the patient since, and cannot say whether the hair has recovered its color. All I can say is, as it was stated to me, that during the time he was suffering extreme pain on the left side the hair over the temporal region became nearly white—that difference in color suggesting to myself some structural deterioration, and to the patient the propriety of having his head shaved and wearing a wig.

"*Diseased Molar Tooth of the Lower Jaw producing Excoriation of the Auditory Canal on the same side, and an Enlarged Lymphatic Gland, Cured by Removal of the Tooth.*—In last year's lectures I mentioned that a professional friend of mine had suffered from a condition bearing on the subject of the influence of nerves upon the structures supplied by them. That friend, unfortunately, is no more. It was Dr. Addison to whom this happened. The case is one of some interest, and I will repeat it in a few words. Some years ago Dr. Addison had a very offensive discharge from the auditory canal of one of his ears, which annoyed him very much; and below the external ear was a small gland enlarged in the upper part of the neck. He had tried various remedies for this discharge, and had gone, I believe, to some surgeons who attended specially to the ear; but, as far as I could learn, no good resulted from any of the applications. Upon examining the ear from which the offensive discharge proceeded, I found a slight ulceration upon the floor of the auditory canal. On arguing the question out between us, we came to the conclusion that the ulceration probably depended upon a diseased molar tooth in the lower jaw on the same side. We had that tooth extracted, and in a very short time the ulcer healed, the discharge and morbid secretion disappeared from the auditory canal, and as soon as that ulceration was cured the enlarged gland subsided. Here the true cause of error was remotely situated from one of the most prominent symptoms—namely, the enlarged gland in the upper part of the neck; in that respect the case is of great interest. The case stands also in nice and close association with this group of results of nervous disturbance which prove that irritation induced in a nerve, or pressure upon a nerve, is sufficient to lead to more or less change in function and structure, and that that morbid influence may after a time induce a deterioration resulting in, or sufficient to produce, a furred tongue, ulceration of skin, or gangrene of the fingers. In Dr. Addison's case there was ulceration in the auditory canal, and the gland enlarged as the consequence of the exposed lymphatics absorbing and carrying the morbid fluid of the ulcer down to the lymphatic glands. That I believe to be the true interpretation of glandular enlargements from the irritation, as it is termed, of a remote cause; the 'irritation' is supposed to travel along the lymphatics to the anatomically associated glands. I believe this hypothesis of irritation is an erroneous idea, and that the true explanation is, the arrival at the gland of a morbid fluid conveyed to it by the lymphatics. I doubt the validity of the reasoning which endeavors to press upon us the conviction that mere irritation can be conveyed from a sore to a lymphatic gland; it must be that the absorbents carry a morbid fluid centripetally to the gland. Fortunately for us, these glands are highly conservative in their tendency, and they stop the progress of the morbid fluid in its onward course toward the circulation of the blood, where its damaging influence might be more diffused, and lead very frequently to the occurrence of the more serious general condition which we are in the habit of denominating pyæmia."

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"*On the Variations of Excitability in all Living Tissues.* By M. CLAUDE BERNARD, Member of the French Institute; Professor of General Physiology at the Faculty of Sciences, etc.—Notwithstanding all the difficulties which attend experiments upon the nervous system, and in spite of all the discrepancies occasioned by the alternations of heat and cold, the changes of the weather, the seasons of the year, the healthy or diseased state of the subjects employed, and, lastly, the various degrees of sensibility which exist in various kinds of animals—one fact, at least, has now been proved beyond the possibility of a doubt; namely, that, on the point of dissolution, all living tissues exhibit a transient exaltation of this characteristic property. In the nerves, we have recently shown this to be the case; in the muscles, as you have just been informed, the same process takes place a few moments later, that is to say, immediately after the death of the corresponding nerves. A general rule presides over all these phenomena, and regulates the order in which they succeed each other. When the sciatic nerve (or any other voluminous trunk) has been divided, a series of successive modifications, which ultimately end in death, make their appearance; the process of disorganization begins in the central portion of the nerve, and advances toward its extremities; its peripheral ramifications still enjoy a certain degree of excitability after all vestiges of this faculty have disappeared in the main trunk. The temporary exaggeration of activity, which is the immediate precursor of death, follows precisely the same course; it arises, at first, in the primitive trunk, descends to its branches, and finally spreads to its distant extremities; and the action of poisons obeys the same law; it radiates from the centre to the circumference of the system. The muscular apparatus being, as it were, superadded to the nervous system, experiences in its turn a similar succession of change, when the process of dissolution has reached it at last; that is to say, when the last remnant of nervous influence has vanished. Nor does this property belong to muscles and nerves alone, we meet with it in all living tissues; in short, the taper that burns in the socket flashes once more before it dies.

"The application of this proposition to nosology suggests numerous and important remarks. Exaggerated activity in any part of the economy is in general a sign of debility, but more particularly so when the nerves are affected. In hysterical females we meet with a remarkable instance of this, for the morbid sensitiveness which exists in such cases is one of the most prominent symptoms of the disorder. A similar state of things frequently coincides with paralysis. A peculiar irritability on one side of the face has more than once been noticed in patients on the eve of being struck with facial hemiplegia, and the attention of medical observers being now directed to this point, a certain degree of nervous excitement will doubtless be remarked in other cases of paralysis. It is besides a well-known fact that anæmic and debilitated patients labor under a permanent state of nervous irritability, which is not found to exist in persons in the full enjoyment of health. Hence arose the ancient adage, 'Sanguis moderator nervorum,' which proves once more that the transitory excitement here alluded to, far from indicating an accession of strength, is one of the earliest signs of decay.

"The sympathetic nerve does not escape the action of this universal law. Its functions, when at the point of ceasing altogether, exhibit a short-lived exaltation, which is principally revealed by vascular phenomena. In agonizing patients, for example, the temperature of the body, after undergoing a considerable depression, suddenly rises to its former level during the last moments. This fact has in particular been noted in those who die of cholera by M. Doyère. The variation, in these patients, often occupies an extent of several degrees, and the body is not unfrequently found warmer after death than during life. In no case, however, does the post-mortem temperature rise above 36° Cent. (97° Fahr.) These singular phenomena being the result of a paralysis of the sympathetic nerve, will be more fully discussed when we come to study its action upon the vessels."—(*Med. Times and Gaz.*)

Malformed Teeth and Syphilitic Cachexia.—The following cases are presented in the *Med. Times and Gaz.*, in illustration of the potent influence of hereditary syphilis in deranging the physiological processes and in causing abnormal development:—

"*Double Keratitis with large Lachrymal Abscess; Epileptiform Fits; Teeth and Physiognomy characteristic of Syphilis; History suspicious, but inconclusive.*—Mary Ann D., aged 11, was admitted into the Ophthalmic Hospital, with double keratitis in an early stage, and with abscess in the left lachrymal sac. In the posterior layer of each cornea were numerous minute punctate deposits of lymph, very closely resembling those seen in cases of syphilitic iritis in adults. There was slight swelling in both knee-joints. The abscess in the sac was laid open, and mercurial treatment prescribed. She was a poor, miserable-looking child, of bad, pale complexion. There were scars at the angles of the mouth. The bridge of the nose was sunken, and the teeth were most characteristically dwarfed and notched. Her mother stated that when an infant the child was puny and excessively restless, and that she had 'snuffles' and 'thrush' both badly. She was for a long time under medical care, but did not, as far as I could make out, ever take mercury. Subsequently she had discharge from both ears, which left deafness. Two months ago she was under the care of Mr. Lawrence in St. Bartholomew's Hospital, for pains in the bones and failure of sight. She was liable to severe headache, and occasionally to epileptiform attacks. No direct questions were asked of the mother. The patient was the second child, and she had borne four, of whom the first and fourth had been still-born. A very singular circumstance had occurred in this child's dentition. Her mother stated that the first set of teeth had all fallen out by the time the child was three years old, and that for three years subsequently she was wholly toothless.

"*Hereditary Syphilis; Notched Teeth and Keratitis; Epileptiform Fit at the age of four, followed by Hemiplegia; Subsequent and Severe Attack of Epilepsy; Partial Idiotcy.*—Under the care of Dr. Brown-Séquard. Edward R., aged 14. He was quite well until he was three months old, he then had a rash all over him, 'sores and boils,' for which he was under medical care for nine months,—he did not use any ointment. He recovered to some extent, but was always delicate. He became able to walk at 2 years of age, and talked very early. At the age of 4 he was paralyzed, and ever since he has been subject to fits. While out playing at the age above mentioned he was seized with 'a fit,' which, his mother said, lasted from eight in the evening until two the next morning. It was found afterward that he was paralyzed on the whole of the right side. For three weeks he did not speak, but he soon recovered the use of the right side, although not to walk. His mother says that she had again to teach him to walk. He slowly and gradually recovered speech and power of motion. He had another fit six months afterward. They gradually increased in frequency, and he now has them every week. Three years ago his eyes were bad. He attended with much benefit at the Charing-Cross Ophthalmic Hospital. Both corneæ show the remains of keratitis. The pupils are pretty large, and there is no appearance of iritis. Atropine was not used. His teeth present those appearances which Mr. Hutchinson has shown to be very characteristic of hereditary syphilis. He is pale and cachectic-looking, but his nose is not sunken. His mind is evidently very feeble, and his manner is restless and fawning. He cannot read, which may be accounted for somewhat by his imperfect sight and also by want of proper trials to educate him. His memory, especially for recent events, is very bad. When the fit is coming on he gives a scream, the right arm and leg are drawn up, he then becomes insensible, and is convulsed. Until very lately the convulsive movements were entirely confined to the right side, but at present the other side also had been somewhat affected. His mother says that in the fit his mouth is drawn to the left. The duration of the fit varies; it is generally five or ten minutes, but it has been as long as three and a half hours. He generally sleeps for some time after the fits. His mother does not seem to suspect any taint, and no direct questions were asked. She had been pregnant ten times, but has only four children living; and, as Mr. Hutchinson has generally found, the present patient is the eldest living; he is also in this case the eldest born. The second born died at the age of eleven months, of what the mother calls 'nettle-rash;' the third at the age of five years, of 'water on the brain;' the fourth is living, looks healthy, and has good teeth; the fifth pregnancy resulted in a miscarriage; the sixth child born died at the age of one year and ten months, of 'water on the brain;' the seventh and eighth were still-born; the ninth and tenth are living and appear quite healthy.

"*Hereditary Syphilis; Epileptiform Fits with Peculiar Symptoms; Double Keratitis; Characteristic Teeth and Physiognomy.*—The particulars of the following case were obtained from Mr. Hutchinson, under whose care the patient was admitted at the London Hospital. Alfred O., aged 19, a well-grown lad, but of characteristic physiognomy and teeth. He states that he had good health until he was about eleven years old, when he became liable to a peculiar form of epileptic paroxyms, beginning in the left side. His account of these fits is as follows: The fit seized him suddenly one day when out walking; his left leg was affected by painful spasm, which in a short time passed up his side. He did not on that occasion lose consciousness. Since, the fits have recurred with very varying frequency. Once while residing in the country he was a year without having an attack. All the fits begin by spasm either in the left leg or left arm. The limb attacked shakes violently, and 'the muscles are drawn into knots.' This is very painful, and after awhile he falls and becomes insensible. The insensibility has on some occasions lasted several hours, and he always has sickness and headache on recovery. He has never experienced the slightest spasm in the right side of the body. Most of his attacks are not attended by unconsciousness, but consist only of spasmodic contortions of the leg or arm, which, after from three to five minutes, cease, and the limb drops. Any slight excitement, a false step in the street, a sudden noise, etc., will bring on these spasms. He feels a constriction about his throat during them, and is obliged to tear open his neck-handkerchief. He is not aware of the existence of any particularly irritable spot, pressure on which will cause the spasms. His muscles are well developed, and I can discover no wasting or want of symmetry. *Eyes.*—Until a year ago his sight in the right was perfect, the left being not so good. He was then attacked by interstitial keratitis. It began in the right and soon afterward affected the left also. He attended at Moorfields for some months. At present both corneæ are diffusedly opaque, the right much the more so. He can see to read with the left. *Teeth.*—The teeth are as typical as any I have ever seen. *History of his Family.*—His father died ten years ago. His mother is still living. An elder sister, who, if she had lived, would now have been 24, died of phthisis a few years ago. The second child died young. The third, a boy, is now living, aged 21, is in bad health, has, according to report, malformed teeth, and a 'cataract' in one eye; for the latter he has been under much surgical treatment. He was not born with it, and it did not form till he was some years old. The fourth, a girl, died young. The patient, Alfred O., is the fourth and youngest living. One younger than himself died. There is a second family of young children. Alfred O. is well grown; bridge of nose good; head symmetrical; skin thick, yellow, and pitted; deep fissures in lips. He has been under my care for a month, and thinks he has been much better since taking the iodides of potassium and iron. He had previously been under Dr. Parker's care for the fits. He has been accustomed to work in tobacco, but does not think it injures him."

"*On the Natural Dissemination of Gold.*—MR. ECKFELDT, the Principal Assayer of the U. S. Mint at Philadelphia, has lately made several interesting examinations tending to show the very wide distribution of gold. Passing over the evidence respecting its presence in various galenas, in metallic lead, copper, silver, antimony, etc., we recite the following, perhaps the most curious result of all:—

"Underneath the paved City of Philadelphia there lies a deposit of clay, whose area, by a probable estimate, would measure over three miles square, enabling us to figure out the convenient sum of ten square miles. The average depth is believed to be not less than fifteen feet. The inquiry was started whether gold was diffused in this earthy bed. From a central locality, which might afford a fair assay for the whole, the cellar of the new market-house in Market Street, near Eleventh Street, we dug out some of the clay at a depth of fourteen feet, where it could not have been an artificial deposit. The weight of 130 grammes was dried and duly treated, and yielded one-eighth of a milligramme of gold; a very decided quantity on a fine assay balance.

"It was afterward ascertained that the clay in its natural moisture loses about fifteen per cent. by drying. So that, as it lies in the ground, the clay contains one part gold in 1,224,000.

"This experiment was repeated upon clay taken from a brickyard in the suburbs of the city, with nearly the same result.

"In order to calculate with some accuracy the value of this body of wealth, we cut out blocks of the clay, and found that, on an average, a cubic foot, as it lies in the ground, weighs 120 pounds, as near as may be; making the specific gravity 1·92. The assay gives seven-tenths of a grain, say three cents' worth of gold to the cubic foot. Assuming the data already given, we get 4180 millions of cubic feet of clay under our streets and houses, in which securely lies 126 millions of dollars. And if, as is pretty certain, the corporate limits of the city would afford eight times this bulk of clay, we have more gold than has yet been brought, according to the statistics, from California and Australia.

"It is also apparent that every time a cartload of clay is hauled out of a cellar, enough gold goes with it to pay for the carting. And if the bricks which front our houses could have brought to their surface, in the form of gold-leaf, the amount of gold which they contain, we should have the glittering show of two square inches on every brick."—(*Am. Phil. Society Proceed.*, viii., 273; *Am. Jour. Sci. and Arts.*)

"*Cyst in the Antrum; Puncture on two occasions; Cure.* Under the care of MR. BRYANT, Guy's Hospital.—Eliza F——, aged forty, applied with a tumor in her right cheek, of one year's growth. It was evidently an enlargement of the antrum, and, from its globular form, appeared to be cystic. Mr. Bryant introduced an exploring trocar and canula, and drew off two ounces of the peculiar glairy fluid characteristic of these cysts. The fluid, however, subsequently returned, and after the lapse of three weeks a free opening was made above the bicuspid teeth and within the mouth, giving exit to a quantity of fluid similar to the last. The cavity was plugged with lint. Inflammation followed, and some suppuration, which has resulted in the contraction of the cyst wall, and a perfect cure. She was seen three months afterward, and no return had taken place."—(*Lancet.*)

Premaxillary Bone.—"In animals the upper jaw is distinguished by what is known to anatomists as the intermaxillary or premaxillary bone. This bone contains the incisor teeth, and the point of its junction with the outer portion of the jaw is that between the outer incisor and the canine. In the early fœtal life of man this bone is discernible as distinct, but either at birth or shortly afterward, though 'often much later,' all trace of its separate existence is effaced: in the anthropoid apes the anchylosis (*i. e.* the completely osseous blending) of this bone with the remainder of the jaw takes place in early youth; and thus, in this respect also, they approximate to man. The nearness is more remarkable, when we remember how many children suffer from hare-lip, which consists in the persistence of the fissure, not only in the lip, but more or less between the two bones, which in normally developed children is, as we have said, usually closed by bony matter about the period of birth. The number, general character, and order of arrangement of the teeth of the higher apes correspond with those of man: the chief differences being that the former are stronger, especially the canines, and that these have a slight interval between them and the incisors in the upper jaw, and between them and the bicuspids in the lower jaw, into which the points of the canines are received. There is a slight difference, too, in the surface of the molars; and while in the ape the bicuspids are implanted by three distinct fangs, two external and one internal, in man they have only two fangs, one external and one internal; and in the Caucasian race the two fangs are sometimes united."—(*Extract from a Paper on "Equatorial Africa and its Inhabitants;" Westminster Review.*)

"*Adulteration of Metals.*—An admixture of old iron or other inferior metals in pig-lead is frequently practiced in Russia, and is found by taring the whole block of metal on large balances with pure lead weights to counterbalance. When they have been balanced in the air, they are simultaneously immersed in water, and in case any admixture of a lighter, *i. e.* inferior, metal be present, it will show itself by the balance containing the pure lead weights sinking deeper than the other.

"This method may be used for examining silver or gold coins that may have the full weight of the genuine coins, but yet be very much different as to specific gravity. Of course it is understood that all metals used as adulterants are not only cheaper, but lighter."—(*American Druggists' Circular.*)

MISCELLANY.

The following remarks on the mode of preparing nervous matter for microscopic observation are copied from a memoir of some researches on the minute anatomy of the spinal cord, by Dr. J. Dean, in a bibliographical notice thereof in the last number of the *Amer. Jour. Med. Sci.:* "The method of preparation usually employed was a modification of Gerlach's and Clarke's, although many others were employed, according to the object in view. The following method gave the best result from which to make drawings. Thin sections from the cord, hardened in alcohol, were washed a few minutes in pure water, and then immersed in glycerin to which Gerlach's solution of carmine, in water, to which a few drops of strong ammonia have been added, previously filtered, had been added; in this the sections were allowed to remain four or eight hours, according to the tint desired, (a light tint interfering least with the details and sharpness of outline.) I have been able to obtain more delicately colored specimens and more clearly defined structure by the use of glycerin than by any other method. The sections are then washed first in pure water, afterward in strong alcohol, in which they are allowed to remain about an hour, and are now ready for preparation with turpentine, according to Clarke's method; they may be put up in Canada balsam, or, as I have found very advantageous, in thick, colorless copal varnish, which often preserves minute details better than balsam. Although Stilling and others have found much fault with Clarke's method of preparation, on account of the too great transparency it sometimes gives, I am convinced that, with practice and some slight modifications, it is the only one suited to the minute study of the cord, other methods seeming to me, after thorough trial, quite unsatisfactory as compared with Clarke's. As a hardening material, I have often employed chromic (?) acid with considerable advantage; but when coloring matter is used, alcohol is most suitable, and is certainly much easier to succeed with."

In relation to the discovery and value of keroselene as an anæsthetic, a writer in the *Amer. Jour. Sci. and Arts* says: "The vapor of this substance possesses very decided anæsthetic properties. This was first accidentally noticed by its effects upon a laborer engaged in cleaning a cistern at a coal-oil manufactory, and afterward proved by the workmen by experiments upon flies and mice. Whether it can be employed without danger as a substitute for ether or chloroform is as yet undecided. Dr. H. J. Bigelow (*Boston Medical and Surgical Journal*, July 11, 1861, lxiv. 494) reports several cases in which its exhibition was attended with unfavorable symptoms; and at the present time the general feeling of medical men in Boston with regard to its value is evidently much less favorable than when it was first brought forward. It may be remarked that the 'keroselene' in question is exceedingly well purified as far as relates to its odor, being almost entirely free from the objectionable smell which characterizes most of the light coal oils."

In an article on bridge building, translated for the *Franklin Institute Jour.*, MR. CEZANNE makes some remarks upon the effects of compressed air on those who go down in the diving-bell. These necessarily vary according to the degree and steadiness of the pressure, a rapid change usually causing more or less derangement in the nervous and vascular system. The following, in its relations to etiology, is of more immediate practical interest to the dental practitioner: "When cooped in the air chamber to allow the closing of the upper valve, a cock is opened for the entrance of the air, one is immediately seized with a violent buzzing in the ears, attended with pain, whose intensity varies with individuals. The air is of an oppressive heat, with a strong smell of caoutchouc and sweat. There is utter darkness. Care must be taken to avoid opening the cock for the entrance of the air, before making sure that the outlet orifice is well closed. If this precaution is neglected, one is caught in a violent current of air, which immediately causes severe neuralgic pains in the teeth, temples, and ears. * * * The time of departure, though but little painful for the majority of individuals, is the most dangerous for the workmen. As soon as the compressed air escapes from the air chamber, the temperature lowers suddenly, the vapor condenses, and when the upper valve is opened, one issues surrounded by a cloud. At this moment blood sometimes flows from the nose and the throat; some persons experience violent neuralgias, but of short duration; others have tooth and headache for many days."

In a letter from Paris to the *Amer. Med. Times*, DR. DAVID P. SMITH states that he saw in the wards of JOBERT DE LAMBALLE at Hôtel-Dieu, "a very interesting case of a young woman with an enormous aneurism by anastomosis of one-half of the lower lip and side of the cheek, and also of one side of the tongue. For some reason or other this affection had been allowed to remain ever since birth, and it had now caused great deformity of the lower jaw and absorption of the alveolar process."

The following, among other cases of interest, are reported in the *Med. Times and Gaz.* as having come under the care of MR. ESSEX BOWEN, in the Chester Infirmary: "A healthy, married woman, aged 36, with four children. An irregular solid tumor of the right upper maxilla, projecting and well-defined at its posterior limit, between the first and second molar teeth, and encroaching unevenly upon the roof of the mouth. It has been of slow growth, painless, and of firm consistence. Its anterior limit was between the canine and first bicuspid teeth. The first bicuspid and first molar were extracted, and the soft parts having been dissected up from the bone, that portion of the maxilla giving attachment to the growth was completely removed by aid of bone-scissors. Chloroform was commenced with, but it was subsequently found impracticable to persist in its administration. The resulting hæmorrhage proved obstinate, and was only suppressed by resort to the actual cautery. She remains free from any sign of a recurrence of the tumor, (March, 1861.) The appearance of the tumor after removal, as well as its history, points to its being of a benign nature. A woman, aged 25. After having suffered, three years ago, from what was described as a large cystic tumor of the left side of the lower maxilla, and which was cured by the extraction of a 'row of tooth-stumps,' she was now troubled with an enlargement in the upper maxilla of the same side, above the canine tooth, elastic to the touch. The tumor was freely incised, giving exit to a serous fluid, in which a quantity of cholesterine was suspended, and the cavity stuffed with lint. This led to a perfect cure, and all enlargement has disappeared from the cheek."

In the course of an interesting lecture upon chlorine, in the *Chemical News* of August 17, DR. EDWARD FRANKLAND treats of its affinitive relations with other elements. The whole article is worthy of republication, but as our space is so very limited, we select the following, which seems most pertinent: "This element—chlorine—is remarkable, in the first place, for the great intensity of its affinities. It is difficult to say whether oxygen or chlorine possesses the most powerful affinity for other substances. There is a sort of contention for the mastery between these two elements. Sometimes we have chlorine expelling oxygen from its combinations, and we have sometimes oxygen expelling chlorine. We may say that the affinities of the two bodies are very nearly equal, but there is just this peculiarity about chlorine, that its affinities are generally capable of being exerted at ordinary temperatures. We have found that oxygen requires usually the application of an elevated temperature to bring its affinities into play. When we wish oxygen to combine with hydrogen, for instance, we have to apply heat to the mixture in order to bring about that combination; but chlorine, on the other hand, is capable, in a great majority of cases, of combining with other substances at ordinary temperatures. * * * * Chlorine possesses some peculiarities in its tastes, so to speak, for combination. It unites with hydrogen and with the metals, with very great energy, but it is incapable of uniting directly with carbon. At any temperature to which we like to expose the two elements, they will not unite. Carbon, you will recollect, burns in oxygen at an elevated temperature with very great energy indeed, and we have some forms of carbon which take fire in atmospheric air without any application of heat whatever, but you cannot by any such direct process induce carbon to combine with chlorine. * * * * Chlorine exerts great bleaching and disinfecting powers. Its affinity for hydrogen endows chlorine with both these powers."

The *Amer. Druggists' Circ.* says that, "to make pure silver out of coin, dissolve the latter in an excess of nitric acid, precipitate the cold solution with a solution of chloride of sodium, decant, and wash repeatedly with water; then place the precipitate on a linen strainer in a porcelain capsule in contact with pure metallic (Pennsylvania) zinc or iron, and cover with very dilute muriatic acid. When the whole precipitate is converted into a uniform gray powder, remove the remnants of zinc or iron, wash the silver with hot water, dry it, and fuse it in a crucible under a cover of borax and nitre. Or the chloride of silver well dried is fused with a little rosin and an equal weight of bicarbonate of soda."

The same authority states that "MR. RUOLZ's nickel alloy, as a substitute for fine silver, consists of from 20 to 30 per cent. of silver, with 30 of nickel and 50 of copper. An alloy of this kind, but with less silver and nickel, is now used in Switzerland for coining."

A communication in the *Lancet* on the value of Conservative Surgery has brought out quite a number of cases of successful reunion of organized structure after more or less complete separation, and among others the following, by MR. J. JONES, which is similar to one recorded in this journal some time since. "In another instance, a gentleman's valet, suffering from very severe facial pain, requested me to remove one of his under molars, and though I assured him the tooth was free from disease, it was extracted early in the morning. He put it in his waistcoat pocket, kept it there all day, and in the evening came again, requesting me to replace the tooth. With some little trouble I did so, and in about ten days it was as perfectly united by gomphosis as though it had never been removed."

BIBLIOGRAPHICAL.

Buffalo Medical and Surgical Journal and Reporter, edited by JULIUS F. MINER, M.D., Surgeon to Buffalo General Hospital. The editor of this new and interesting monthly has manifested commendable energy in commencing the publication of a medical periodical in these unpropitious times for such enterprises. We hope he may be rewarded with the success he so deservedly merits, both in a scientific and pecuniary point of view. We place the journal on our exchange list with pleasure.

THE

DENTAL COSMOS.

NEW SERIES.

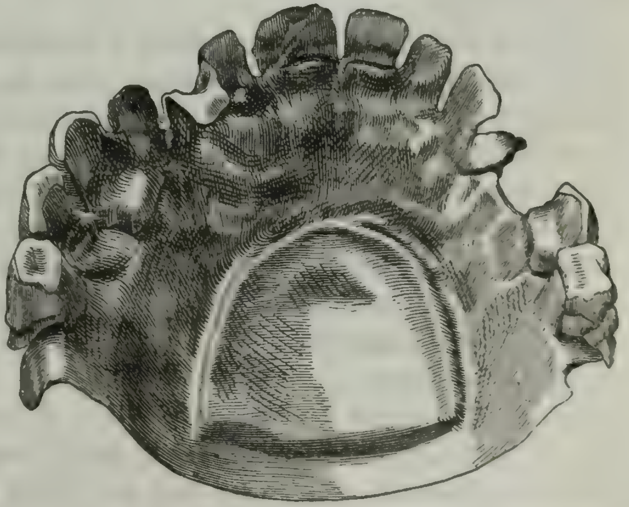
Vol. III. PHILADELPHIA, NOVEMBER, 1861. No. 4.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Atmospheric pressure, for securing upper sets of teeth in the mouth, has engaged the attention of the dental practitioner for a number of years. But what *form* of plate was best calculated to effect that object, has given rise to some difference of opinion among dentists. Some believe that what is called a *plain* plate is as good as what is called a *cavity* plate. Our experience is in favor of the latter. If the alveolar ridge were to remain as permanent as a cylinder of iron, and a perfect adaptation was obtained, perhaps this view would be correct; but, as it is constantly undergoing change during the whole life of the patient, it cannot obtain for a very long period of time There are, however, a few patients who can manage a plain plate better than a cavity plate; but it is not by atmospheric pressure to any great degree, but habit of retaining the piece in place by the lips, cheeks, and tongue. Those cases do not, as far as we have been able to observe, form a rule, but the exception. There are cases where these exceptions cannot by any possibility apply, however well they might answer in some. We mean such as will be understood by referring to the cut in the margin. It is a case where only the teeth back of the first bicuspid are lost, and all in front are remaining. From a loss of the back upper teeth, the lower front ones clash against the back parts of the upper, and cut them



away, until they become sensitive to pressure, or until the nerves are exposed. As all, or nearly all, of the lower teeth are good, it would be difficult to apply spiral springs to retain such a set *in situ,* especially to be of any use to the patient; but, by the *central* cavity, all the difficulties are overcome without incumbering the mouth, or incommoding the patient. It will be seen, by referring to this drawing, that there are projections of the plate extending down toward the cutting edges of all the front teeth on their back parts, so that when the mouth is closed, the lower teeth strike the gold instead of the teeth; this prevents the future wearing, and affords a surface for chewing, if the back teeth on the plate, in conjunction with the natural lower ones, fail to be useful.

We have made a great number of such pieces for the last sixteen years, and we believe we were the first to direct attention to this subject; it has served our purpose well in very many cases. We believe that what is called Gilbert's central cavity plate is the best that has ever been used for partial as well as full sets of teeth, and in all probability it was the first that was used. We use none other; but we do purpose, in this paper, to give the whys and wherefores for or against any plate, as our practice with it is successful. It has been a number of years since this plate was introduced to the profession, by one who was not a dentist. It was discovered by that same train of reasoning which has characterized nearly all useful inventions, and to the author of which the dental profession and public are under everlasting and profound obligations. We believe we were the first, or, at least, among the first, who employed it in Philadelphia. We never had the pleasure of meeting the inventor until we attended the Dental Convention, held at New Haven, in August last, the result of which was the receipt of the following letter on return home, which will explain itself; for which we thank him in a manner which words fail to express:—

New Haven, August 10th, 1861.

Dr. White.

Dear Sir:—After thanking you most kindly for the friendly shake of the hand which I received from you, on being introduced to you by Dr. Stevens, of this place, and also for your politeness in asking me to write you, I gladly embrace the opportunity to inform you how it was that I discovered the central cavity plate; and first would say that it has been remarked that "necessity is the mother of invention." It was necessity that called my attention to it. I am a confectioner by trade, and I think confectioners are more apt to loose their teeth than any other class of men. The cause, perhaps, is that they have much to do with white sugar. That you spoke of at the convention. I had the misfortune to lose my teeth when about forty years old. I applied to a dentist for an upper set of teeth, which he told me were got up upon the principle of atmospheric pressure. I could not use them to masticate my food, and could scarcely keep them in while talking. I applied to another destist, but with no better success; to a third, with the same result. I felt badly, and suffered much for the want of teeth. I inquired of the dentists in New Haven, and also of many in the City of New York, how they inserted mouth-plates. Some told me they did it by springs; others said by atmospheric pressure. I asked them how they applied the pressure. They all said it was done by having the plate fit perfectly the roof of the mouth. I then thought that the reason I could not use my teeth was that they had not made that perfect fit, and would try to do it myself. I commenced with a determination to accomplish it if it were a possible thing, and so great was my perseverance, that I continued to strike up plain plates for a year and a half, thinking all the while that I had not got that perfect fit, as none of my plates would adhere with much tenacity. I felt quite badly, for I thought I should have to spend the remainder of my days without teeth. I thought I would give it up and try no more; but having witnessed the experiment with the air-pump and the two hemispheres, to show the pressure of the atmosphere, it occurred to me one night while in bed, and thinking upon the experiment, that that was the way to apply the pressure to mouth-plates. I thought if I should make a cavity in the plate it would make one hemisphere, and the roof of the mouth would make the other, and I could use my tongue for the air-pump. I was up quite early in the morning, made the cavity in one of my plain plates, placed it in my mouth, and exhausted the air by suction, and found that it adhered with great tenacity. I then felt like the man who, when having solved his great problem, rushed through the streets, partially clad, crying "Ureka, Ureka!" But my spirits were soon dampened, for I experienced quite an unpleasant sensation in the roof of my mouth, a sort of drawing which caused me to think that it would cause gangrene in the mouth, and that after all I would have no teeth; but I thought I would keep the plate in and see what the result would be. After wearing it for perhaps twelve or sixteen hours, the unpleasant sensation passed away, and the plate felt quite easy. I then had teeth put upon the plate, and found that I could use them quite well, and have used them ever since with much comfort. I am now sixty-five years old.

Impressions were taken at this time with wax, and the fitting of the plate was attended with much difficulty. One dentist here (Dr. Thompson, who is now dead) told me that he had tried plaster of Paris, but could not succeed with it; that it would not answer. Knowing how to work plaster, I thought I would try it. I did so, and succeeded admirably. I informed one of the dentists here concerning the matter, and he said (after having tried it) that it was worth a million of dollars. (Dr. Crosby was the person.) I also showed the manner of taking impressions with plaster to several dentists in the City of New York, in Boston, and other places. The improvements have cost me much time and hard labor, and although I have received but very little for my trouble, I am thankful that I have the pleasure of thinking that I have done some good to suffering humanity, and also received thereby much comfort myself.

I am, sir, with great respect, your humble servant,

Levi Gilbert.

P.S.—My birthplace is Sharon, Mass. I served my time in Boston, and resided in New Haven thirty-seven years. It was by perseverance that I discovered the central cavity plate, together with much patience and hard labor.

"LIFE."—DOES BEING IMPLY THE RIGHT TO LIVE?

BY WM. H. ATKINSON, M.D.

[Read before the American Dental Convention, New Haven, Connecticut, 1861.]

As certainly as organ implies function, does being imply the legitimacy of that existence.

Here we are met by the objector with partial and distorted statements, upon which men make up fractional judgments, which they hastily put forth as the *law.*

The mere rudiment of an organ in a fractional, undeveloped state, is not capable of exercising function, even under the most limitless permit of freedom; but it does foreshadow the possible function as soon as the law of perfectibility has completed conditions. In like manner does being imply the right, not only to possession of the abstraction to live, but also to be sustained in active and joyous exercise of all normal powers under proper limitations: hence, all grades of life must have a where, and a when, in exact equipoise of their natures—some time and place in the vast universe of the creative force. If this complete harmony of the correlations of being were attained, no place would be found for discordant and invidious "RIGHTS."

Right and *wrong*, in the common appreciation, partake so much of the primary selfishness of profound ignorance, that all rights but those of the arbiter of the especial case at issue are at once arbitrarily ignored: he forgetting that no wrong can be perpetrated, in even the smallest degree, to any one, without at the same time opening the whole flood of wrong, not only to the one particular instance, but to the entire system of things, whether in the most confined or the most extended sense.

These two much-abused terms then, it appears, admit of partial or complete definition, the latter of which they have never yet practically had since that grand lapse from the divine image that was the inception of this planet and appurtenances. And just so long as we expect perfection or completeness here, will we prove our primary undeveloped state to all who have wholeness of perception to understand that we, as yet, but see through a glass, darkly, and are in a metaphoric condition.

Do you say, we very well know that, spiritually, the statement is correct, but we doubt the proposition physically applied?

If it is correct spiritually, it is glaringly certain, corporeally. All consent that *function*, the *act* of organism, is spiritual; but deny that organic relation depends upon a spiritual type to construct bodily forms, which symbolizes the type, and produces visible acts which are but the outcrop of the invisible omnific spirit power, that we could not apprehend until it had thus clothed itself in the coarse garb of materiality, expressly to awaken the sleeping character within us to aspirations for a higher life, making us willing to pass cheerfully the cataclysms of the morphological lave.

A thing may seem wrong when judged in the light of a partial understanding or incomplete statement, that in its reality, is in exact agreement with everything else in the universe.

If human metamorphosis were complete, all the labyrinths of science would be as clear to us as the plainest mathematical propositions or logical processes. Just so long as men *differ* about the perception of the eternal principles of truth, just so long have we the patent testimony before us, that they, one or both, are as yet incomplete, or only passing through the clarifying and illuminating processes of morphological development (perfectible only in angelhood.)

The divorce of the sciences, like the mosaic divorce, resulted from a desire to accommodate the law to the ignorant selfishness ("hardness of heart") of individuality.

Each *branch* setting itself up for, and giving out that it was the *tree* of knowledge—and honestly, too, for it does not know that there is knowledge beyond the limit of its own field, until after it has outgrown its primary experiences by contact with other branches, moved by winds and storms, which are, like itself, but parts of the grand trunk that supports and needs them all. Thus, we plainly perceive that perfectibility can find no absolute definition in its great sense, short of the Infinite himself; let this, then, be the grand centre to which all our conjugations (not divorces) may constantly converge, and then the *harmony* of the sciences will begin to find approximation to definition in our mental centres.

Every human soul is in connection with every other human soul in the universe, just as every star is in connection with every other star, in the vast firmament around us. If we consider the relations subsisting between the stars, it is very evident that their rays all commingle in an infinity of ways. Those at the greatest distances, probably not being to human eyes perceptible one from the other, but nevertheless supplying fractional pencils of light, quite evident to the human eye when assisted by glasses of high power. This proves that a certain quantum of light is necessary to produce vision in us, when impinging upon a given space of the retina, for as soon as the space is enlarged by the magnifying power to a given size, vision becomes at once practical.

Our electrospheres send out emanations like rays of light to the vastness of space, and communicate appulse, to other electrospheres of like tenuity, thus establishing a sort of commerce between them, that may, or may not be conscious, to the individuals exerting the influence.

It is the exception, rather than the rule, to be conscious of the effects we produce on those about us. *Voice* is an example of this, all things have voice to him who *hears*—Voice of gently falling snow and rain, voice of rustling grass and dying leaf.

The babe, the child, the youth, the man, may all be distinguished by the voice. The matron, maid, or virago, are subject to this law of voice in the exact ratio of their predominating state. The heart that has never been born out of its self-love, cannot possibly utter a full love-note.

Bird, beast, and bush, rock, shell, and tree, have voice themselves, or modify other voices produced in their presence.

The want of harmony in nature so much complained of, is but the criticism of the novice upon the advanced processes of a science too high for him, for in the great sense there is no schism nor inharmony. The primal who enjoys melody, and calls the different notes producing it, harmony, will of course find fault with the most perfect harmony that a full orchestra could produce; just so does the primal philosopher mistake the flats and sharps of life's contact, because he never rises enough above them to arrange them properly.

Our soul petals, like the geranium leaf, or the corrolla of fine-scented flowers, give out a richer fragrance when bruised; so true is this that it has passed into a proverb, that "The dying notes of the swan are the sweetest strains he ever utters." So he who can enchain an audience in wrapt attention, has paid, or will pay, in suffering for the elevation of power he possesses, in the exact ratio of its exercise, if it be not the immediate inspiration of divine influx from above, almost unconsciously transmitted, to accomplish that whereunto it was sent. For whenever we imprison this power, and individualize it, so as to be able to exert it, at will, we have stolen the livery of heaven to serve selfish and groveling ends, and must be made perfect through suffering. It is easy to die, but to come to life, is what causes the convulsive throes of organized corporeal existences. In fact, pain is only predicable of a conscious existence, and hence cannot exist, when this is suspended for any cause. Just what death is, has not yet found adequate definition. If "separation of soul and body" be a correct definition, then death is but relational, and partial, not eternal nor complete, for the same entities are constantly forming new combinations in death as well as in the various phases of life. The rule is, throughout the organized world, one form must die that another may live, so that which annihilates one, only gives new and accelerated birth into another stage of the advancement of life on this planet. Were we to look upon our death as a new birth, and that into a higher life, the old monster would be stripped of all his terror, and revealed as, truly, an angel of light, pointing the way to paradise.

Metamorphosis would be a more strictly correct term for the process called death.

Much would be learned from the little silkworm, or any of the moth family, could we but interrogate them as to their memory, recollection, or consciousness of the phases of life through which *we* very well *know* that they pass. Angels, no doubt, look upon us undergoing our metamorphoses, and plainly perceive the exact identity, of our being, with its additions and subtractions, as we do of these little creatures, who also are held by the same divine tether. How happy and blessed would it be, if we were willing to shed the old cuticle of first experiences with as little trepidation, or clinging, as they do theirs, and as willingly and earnestly set about the work of prehension in the advanced state, forgetting the things that are behind, and vigorously reaching forward to the necessary growth and improvement, that we may the sooner and the more vigorously put on our angelhood,—corresponding to their perfect or winged state.

The marked distinctive differentiation between man and his fractional stages of life, in the mineral, vegetable, and animal representatives, is, they all have a certain limit of improvement or perfectibility, while he knows no such normal limit. Those creatures who are only in possession of the two elements of being, instinct and knowledge, are as perfect at maturity as in advanced age; while those that add the intermediate grades of mental activities, are capable of education in the ratios of the complications of the processes of which they are mentally capable.

To make lines of demarkation here, would be too severely analytical; nevertheless, I do heartily acknowledge, that any true synthetic statement must bear the closest analyticism, even down to its molecular minutiæ: but time would fail us to eliminate the full detail.

An incontestible "testimony" of the progressive formation of bodies is laid up for us in the Earth's crust, whose formation latentized—so much heat in the process of crystallization, formerly derived from the internal fires of the globe—as to cool down the surface to such a degree as to necessitate the higher organizations to take dominion of the field, who might receive the heat from the sun direct, and store it in organisms, thus enabling them to evolve it in such degree as to defy the exigencies of temperature, to an extent not yet displayed by the low tropical gigantic plants, who were fed through the influence of caloric, set free from internal furnaces alone; the sun's heat as yet not having penetrated the thick clouds and mists then forming the dense atmosphere loaded with the more ponderable and irrespirable gases, a diffuse light favoring such monstrous growth,—a law that prevails even to the present, in the dense dark tropical forests and marshy lagoons abounding in enormous endogens, bamboos, and rushes.

There is no mourning requiem in nature for the extinct growth of the primal times, but rather a hilarious rejoicing in the clearer and purer atmosphere, in which an indefinite advance in abundance and variety of much finer organisms obtains.

To him who denies this necessarily progressive nature of all things, and successive elevations and refinements by the morphological processes of life, the whole planet with its innumerable inhabitants, yea, and heaven itself, is but one inexplicable, senseless jargon of atoms, tissues, organs, and beings, in ceaseless antagonism.

Who ever heard of the hungry kite sparing the tender sparrow, or having his repose disturbed, while digesting it, by horrid visions of the injustice he had committed to get his dinner? or of contemplating the keen distress of the nestlings he had orphaned by appropriating to his own selfish use, their natural guardian and progenitor? Would he not rather with a knowing wink of his eye, or significant nod of his head, congratulate himself upon the nice and easily-digested dessert that awaited him when hunger should prompt the innocents to their loudest plaint, exposing their retreat, and insuring their destruction?

Or who ever knew a miser to relax his grasp upon his ungodly gains when told that gaunt want, starvation, and death were imminent in the household he had wronged? Do not such rather reason with themselves and their reprovers, that if they had not come into possession of this property or means, that some one else would, and upon the whole it was quite unavoidable, and thereupon dismiss all qualm of conscience, saying it is no matter of *mine*—let the legal and proper town authorities take charge of the miserable paupers, and not be disturbing honest, quiet people with the spiritless, useless offspring of an improvident parentage?

A close scrutiny of the world of mankind will display to the earnest inquirer, that all the "brute beasts that were made to be destroyed," are, as to personal identity in the true sense of life, not quadrupedal in their configuration of bodily existence. "The runner is not crowned except he strive lawfully." The necessity of each being in his proper "lot and place," to insure advancement, is here clearly set forth. Then as abstract individual being proves its legitimacy, within its normal limits, and activity being the *sine qua non* to an equable and vigorous development and growth; whenever these conditions are interfered with by any competent force, arrest, distortion, or destruction awaits the organism concerned.

These things being so, how infinitely important does it become for each to take *heed*, that he coincide with the laws of his being in all their multiplied phases. To do which, intelligently, involves the necessity for us all to be busy about the work we have to accomplish, to avoid being set back, monstrosized, or ground to powder—set back, when found in inharmony with our fellows; distorted, when opposing ourselves to the physical laws; or when, in our foolish selfishness, rushing heedlessly on the "thick bosses of Jehovah's buckler," in the vain attempt to abnegate His existence, bringing, with fearful rapidity, *annihilation* to ourselves, as to original identity!

LEECHES.

BY PROF. J. RICHARDSON.

(Concluded from page 133.)

Congestion and Inflammation of the Pulp after the Operation of Filling.—After filling in over an exposed nerve, or where but a thin lamina of bone or animal substance intervenes, it not unfrequently happens, after all the expedients usually practiced to protect the pulp from the casualties incident to sudden alternations of temperature, and other exciting influences, have been adopted, and after the nerve has been medicated in the various ways recommended, that the best-directed efforts prove impotent to save the nerve alive, and it either dies from the effects of disease, or the operator, in anticipation of a greater evil, adopts a lesser one—removes the filling and destroys the nerve. Now the chief value of local depletion is in this class of cases; but to understand better the *rationale* of this treatment as a preventive or curative measure, let us digress for a moment to inquire into the causes operative in producing the untoward results which so often follow the most skillful operations performed under the circumstances mentioned.

We will take an illustrative case. The cavity to be filled is deep seated. The patient perhaps has suffered no continuous or considerable pain in the tooth, and has only found it sensitive to impressions of heat or cold, or to the action of other local stimulants. The cavity is excavated preparatory to filling, and we discover either an exposed nerve, or but a thin layer of partially disintegrated bone, or animal substance, covering the pulp. The progress of decay has been gradual and of long continuance, and for months the pulp has been exposed to the baleful influence of various irritating agents, as sudden atmospheric vicissitudes, hot and cold drinks, and the continued presence of alimentary and other substances lodged within the cavity, acting persistently as chemical or mechanical irritants. Does any one suppose for a moment that the pulp will maintain its normal condition under such circumstances? On the contrary, may we not infer that, in an organ of such extreme delicacy, vascularity, and sensibility as the pulp, functional derangement must ensue, —that vascular excitation, increased flow of blood, and engorgement of the vessels must be *permanently* established? If such be the case, why, it may be asked, do we not always have concurrent toothache? We answer, because the plethora is gradually established, and the nervous sensibility of the pulp becomes, in some measure, modified by the changed condition of the vessels, becoming, by degrees, more tolerant of pressure. Moreover, there is a point in the congestion of the blood-vessels short of that which would induce positive pain by compression, where a *congestive equilibrium* (if we may be allowed the expression) is established and maintained by serous exosmose through the coats of the vessels, and which finds a perpetual outlet, either through an opening into the carious excavation, or through the pervious superimposed layer of bone or animal lamina.

Under these circumstances an impervious filling is put into the cavity, previous to which, however, the nerve has been medicated, capped perhaps or shielded by some non-conducting material. The patient is dismissed, and the operator lays the "flattering unction to his soul" that *all* *is right*, when, eight chances in ten, all is wrong. In a few hours, or days at most, the patient returns with pain in the tooth. It is generally a continuous ache, sometimes slight and dull, but more frequently severe and throbbing, increasing all the while in violence. If the symptoms are very urgent, (as they usually are,) the operator resolves at once to remove the filling, destroy what he could not save, treat the tooth, and refill. Is this management of the case rational, necessary, or justifiable? In a majority of cases, if the patient returns before there is organic lesion of the nerve induced, we believe it is neither.

Now, what pathological conditions have we present in such cases? Probably nothing more than serous effusion with simple engorgement of the vessels of the pulp, for the patient will be likely to seek relief before inflammation sets in; still, to these conditions we will assuredly have inflammation superadded, if the former are not quickly relieved. What provokes these issues? We answer, the impervious filling shutting off the customary serous discharge through the orifice of exposure, confining it within the cavity and damming it back upon the pulp, the latter soon becoming close pressed within its unyielding bony cell by the accumulating serum. Following this effusion, we have greatly exalted sensibility from compression of the nerves, inducing increased vascular excitement and flow of blood to the parts, and unless these conditions are promptly relieved, the increased determination of blood and vascular congestion will proceed quickly to inflammation, and from that to absolute death of the nerve.

Now, are our therapeutic resources so limited or so impoverished that they afford no sufficient remedy for this complication of morbid action, enabling us thereby to retain our filling and preserve the nerve alive? What is the plain and palpable indication? Free and prompt depletion of the blood-vessels of the pulp, unquestionably. For what purpose? The relief of existing congestion by unloading the vessels, and, secondarily and sequentially, absorption of effused serum.

We do not claim that serous effusion occurs invariably after an unfavorable operation over an exposed nerve; but that it is a concurrent condition and a primary agent in inducing congestion and inflammation of the pulp in a large majority of such cases, we have no doubt. If unfavorable results follow quickly upon filling, they may be, and doubtless often are, due to mechanical pressure or other irritating or morbific causes connected with the filling or unskillful manipulation, or previous tampering with the nerve. If, however, unfavorable symptoms do not supervene for several hours, or days at most, the failure, we believe, will be found to have its origin in serous effusion into the cavity. In respect to the treatment, however, this point is immaterial, for the local abstraction of blood is equally indicated in either case, and so obvious is this indication that we may affirm it to be almost criminal not to give it a fair trial before resorting to other less direct and more objectionable means.

In most cases of simple congestion, the application of a single leech will suffice; yet it will always be necessary, should the first leeching prove insufficient, to reapply them until the vessels regain their customary tone, and the circulation becomes equalized. The same direction applies where positive inflammation of the pulp without structural lesion exists; but in these cases it may be necessary to bleed more copiously and repeat the leeching oftener.

There are doubtless many other pathological conditions of an inflammatory character, either pre-existing or such as are induced by operations on the teeth, where local blood-letting may take precedence of all other remedial agents. As, for example, periodental inflammation, which is often induced by the operation of pivoting an artificial crown, and which, unless promptly relieved, not only inflicts great suffering upon the patient, but may and often does eventuate in incurable disease of the root. The nature and circumstances of diseased action indicating the employment of leeches, however, will readily suggest themselves to the intelligent reader, and need not be further enumerated.

Mode of Application.—In applying leeches to the gum, every precaution should be taken to prevent contact of the worm with any part except that immediately seized hold upon. If the dentist performs the operation himself, he should have an assistant; if the service is performed by a professional leecher in the operator's office, the latter should give his attention to the patient.

The mouth of the patient should be first well rinsed with clean water. If the patient is in the habit of using tobacco in any form, it will be necessary to first cleanse the parts with soap and water, and afterward rinse well with clean water as before, for the habits of the animal in respect to the "weed" will be found more exemplary than that of the patient, manifesting itself in a very decided reluctance to take hold. Before applying the leech, a napkin should be so arranged in the mouth as to hold or support the former, and prevent contact with the lips or chin, while the lip should at the same time be lifted up or drawn out of the way and supported thus until the leech comes away. In applying the worm, leechers usually employ a small glass tube from three to four inches long, the end applied to the gum being curved and smaller than the opposite one at which the leech is introduced. In the absence of such a tube, a large quill open at both ends may be substituted.

The patient being in readiness, the tube containing the leech is applied to the part the moment the worm protrudes its head. In a texture so loose as the gum, and especially if it be turgid and inflamed, the leech will seize hold at once; if not, it may be readily induced to do so by moistening the gum with a little blood or sweetened milk. As soon as it becomes gorged it will drop off, or it may be made to disengage itself at any time by sprinkling a little salt on it. The subsequent bleeding from the bite will continue ordinarily from one to two hours, and as the chief advantages are derived from this secondary hæmorrhage, it should, at the discretion of the operator, be encouraged. If it stops prematurely, the patient should be instructed to rub the incision occasionally with the finger, and if necessary bathe the mouth with warm or tepid water. If, from any cause, the hæmorrhage should be excessive, it may be arrested by making firm pressure over the incision with a little lint; this failing, apply a piece of lint moistened with solution of alum or other convenient styptic, or touch the part with lunar caustic. If the bleeding is urgent and not easily controlled, a solution of the persulphate of iron may be used. There is little danger of inordinate bleeding, however, in the adult, unless a marked hæmorrhagic diathesis exists.

Manner of preserving Leeches.—Leeches are usually kept in jars, in clean, soft water, which should be changed about every third day in winter and every other day in summer. The jar should be covered with a linen cloth, and kept in a room of uniform temperature. Mr. James Banes recommends cleansing them with a whisk of very fine broom or willow every time the water is changed, the object of which is to remove from their surface a thick, slimy coating which accumulates and is a chief source of mortality among them; the addition of a solution of chlorine to the water in the proportion of one or two drops to the pint, or of a little muriatic or sulphuric acid to neutralize the ammonia which forms, has been found to preserve the leeches against diseases to which they are liable.

M. Derheims has proposed, as a means of preserving leeches, an artificial reservoir constructed with reference to the natural habits of this animal, for a description of which the reader is referred to U. S. Dispensatory, p. 371.

Leeches that have been used may be made to disgorge their blood by sprinkling salt on them, or by drawing them from tail to head through the fingers; they should then be put into clean water which should be changed frequently.

CINCINNATI, OHIO, August, 1861.

ALLOYS FOR DIE METAL, ETC.

BY DR. B. WOOD.

DURING the first few years of my practice, I used almost exclusively, for getting up my metal castings, an alloy of lead, tin, and bismuth, as prepared by my preceptor and brother, Dr. J. S. Wood, to wit: for the die or cast, tin, 8 parts; lead, 1 part; bismuth, 1 part. This compound is much harder than tin, melts at a lower heat, shrinks little, or practically none in casting; is tough and strong. It melts at about 330° F. Although generally making use of a harder and less fusible metal for the first swaging, I find this alloy particularly convenient for taking duplicate dies for finishing. Its tenacity adapts it for cases of partial sets representing the teeth.

The mould or counter-die metal is made by adding to one part of this mixture six parts of lead. The result is harder than lead, and does not yield like it under the blow, presenting a resistance sufficient to drive the plate *up* well against the die. Its shrinkage is but slight; it melts at from 450° to 460° F. It is designed for use, when the dipping process is resorted to. If used at the point of congelation, the plaster cast may be employed without previous baking; otherwise it should be baked to expel its water of crystallization. I frequently place the cast in the melted metal, in a melting flask, then melt again; press down the cast to its place, retaining it there by means of a weight, and set aside to cool. By this means the cast becomes sufficiently baked.

I shall now confine myself simply to a description of some of the alloys I have prepared and found most generally useful, not stopping to speak of those recommended by others; my experiments having had reference to the qualities of hardness, tenacity, and fusibility, and the susceptibility of forming perfect castings.

The following formula affords a highly useful alloy, where *toughness* as well as hardness is essential: tin, 16 parts; antimony, 1 part; zinc, 1 part.

This alloy is much harder than the preceding die metal, and equals it in tenacity, being suited for any kind of die; it requires a higher temperature to melt it, but it melts sooner than tin; or, than the mould metal above named, from a matrix of which a die may be taken by it with safety. It affords, in sand, a perfect die, does not shrink, and whether poured into a sand or metal mould, comes out with a smooth, bright face. It is the best combination of these three metals I could produce for the purpose. When, with a view to greater hardness, antimony and zinc were employed in larger proportion, the die came out of the sand imperfect, presenting fissures, pits, or concavities at the point corresponding to the palatine fossa. If tin be used in larger quantity, the alloy is, of course, softer, and it shrinks when cast. The relative proportion of zinc and antimony, in respect to each other, may be somewhat varied, without material modification of the qualities of the compound; but, for the best results, the sum of these two metals should hold to the quantity of tin employed the ratio of about one to eight.

This alloy melts readily enough for use with the mould metal as above mentioned. But when dies are made of it from sand moulds, and a more fusible metal is needed for taking counter-dies from them, it may be had by a combination of 5 parts of lead, 2 of bismuth, and 1 of tin; or 5 parts of lead, 3 to 4 of bismuth, and 1 of tin afford a still more fusible compound, although harder.

A very hard and most valuable alloy for general use may be had by a mixture of copper, antimony, and tin, to wit: tin, 12 parts; antimony, 2 parts; copper, 1 part.

It is not much inferior to zinc in hardness, casts without sensible shrinkage, and makes a perfect and very handsome die, bright and smooth. It is less fusible than the die metal last named, but may be used for taking dies from the first-mentioned mould metal; although melting at nearly the same temperature, this requires care. It will be found of value in connection with lead moulds made by "dipping." It is rather brittle for dies for partial sets, representing the teeth, as these are liable to break on removing from the matrix; but it is abundantly strong enough for swaging purposes.

A still harder alloy is obtained by using 8 parts of tin, 1 part of copper, and 1 of antimony. This possesses the general properties of the preceding; but it is harder to melt, and less *fluid* when melted; and, on cooling, crystallization takes place on the surface, roughening the face of the die somewhat to its detriment.

For *fluidity*, an excess of antimony over copper appears to be requisite. For non-shrinkage, the joint amount of antimony and copper should be to the quantity of tin as about one to four; as for example, 8 parts tin, 1 antimony, 1 copper; or 10 tin, 1½ antimony, 1 copper; or 12 tin, 2 antimony, 1 copper.

In combining these metals, (which may be done in an ordinary charcoal furnace, as it is by no means necessary to raise the heat to the melting point of copper,) place the copper in a crucible and bring it to a red heat, then pour in the tin and antimony, melted, and cover the whole with charcoal dust to prevent oxidation. The copper will soon liquefy, or *dissolve*, as it were, combining perfectly with the other metals, without further elevation of temperature. To guard better against volatilization of antimony, which takes place at a high, red heat, it is well enough to add to the copper but half the tin at first, and when these are combined, add the antimony, and then the remaining tin. This also enables one to conduct the second melting in a larger crucible, or indeed in an iron ladle. It is best to let the melted mass cool down some, before pouring it from the crucible, as if poured out at too high a heat, the alloy oxidizes.

For taking counter-dies or moulds from dies of the last-named alloys, a suitable metal, fusible at about 380° F., is had, by a mixture of three parts lead, one part bismuth, and one hundredth or less part tin. It is wonderful how small a quantity of tin serves to improve the alloys of lead and bismuth, giving them a white, clear lustre, preventing oxidation, promoting fusibility—in short, producing almost a new metal.

By the use of *cadmium*, we may produce still harder alloys than any of the preceding, possessing in an equal degree every other desirable quality.

Thus, 10 parts of tin, 1 part of antimony, 1 of copper, and 1 of cadmium, produce a compound which has about the *hardness of zinc;* it casts perfectly, and is nearly all that could be desired, except that, like the last-named die metals, it is rather brittle for certain castings, as in the cases before referred to. Substituted for copper in these connections, cadmium appears to confer greater hardness and tenacity, (using the latter word in the sense of *toughness*,) and up to a certain point promotes fusibility.

Nine parts of tin, 1 part of antimony, and 1 part cadmium furnish a very hard and tough metal of a compact, homogeneous structure, which casts without shrinkage, forming a perfect die with a smooth, bright face. It melts at about the melting point of tin.

In the employment of cadmium, care must be taken not to subject it to a heat high enough to volatilize it. To avoid this danger, it is best to unite the other metals first, and then add the cadmium at a heat barely sufficient to melt it. The great objection to this metal is its expensiveness.

A variety of other forms of alloys might be given, some of which, doubtless, would prove useful in special cases; but those given are best adapted to general use; and further than this, was not within the intention of the present writing. Should the results here presented prove of benefit to any in the profession, I shall feel well paid, especially in the assurance that this subject happens to be one not likely to awaken hostility, as involving facts in conflict with cherished interests, practices, and inclinations; whereas, when touching upon rival *modes of practice*, a plain record of facts—not swerving from the rigid truth to conciliate interested or prejudiced parties, not taking a middle course between right and wrong to win the credit of "impartiality"—is too apt to provoke from some sources, directly or indirectly, the imputation of "unfairness," which is rather "poor pay" for one's pains.

INDIANAPOLIS, Oct. 1861.

DENTAL LITERATURE.

BY E. R.

So much has been said and written upon this subject, that it seems as if little had been left to say, and that this field, from so frequent cultivation, must present an example of unequaled fertility; and yet to me, it seems as if the undergrowth only had been cleared away, and that the soil still undistured, as yet retains the elements necessary for the perfect nutrition of the plant or tree. On returning from the meetings of American dentists, the question invariably arises, Why is it that good taste is so often offended by the adoption of what may be termed a "bastard nomenclature?" Why is it that the pulp of a tooth is almost universally called a nerve; and the surfaces of the teeth and the anatomical parts of the oral cavity are so frequently erroneously denominated? The description of the diseases of the teeth, with their methods of treatment and "cure," not unfrequently seeming to entirely ignore the *vis medicatrix naturæ* in many cases, must clearly prove to the educated mind that the speaker (and sometimes writer) has given the subject but a superficial examination. It is true, that these errors are sanctioned, or at least claim to be, by general usage and adoption; but, I ask, is it any excuse for their use, and can we, as a profession, hope to attain to that elevated position which is our due, unless we cast aside the vulgar idioms of the careless and uneducated?

It is an old but just saying, that it is easy to pull down, but difficult to remodel and rebuild a structure; but I cannot concede that in this case it will be applicable for the errors of language, and of pathological and physiological conditions can be overthrown by a more perfect knowledge of dental literature. It may be well for me to explain in what this consists; not merely, I consider, in the occasional perusal of the few text-books at present belonging to the dental profession, but in the study of those works which are the only firm foundation for medical and dental knowledge and practice. Neither will the regular subscription to and reading of dental periodicals—though I consider them indispensable—impart this information, unless accompanied with frequent reference to, and study of both dental and medical text-books. Our art, being in itself a combination of the mechanical and scientific, will naturally call for mental application as well as manual labor; and yet, are we not all too prone to give the latter the greater if not all of our time and attention? How few, considering the aggregate number of our profession, possess or are even familiar with the works of Richardson, Snow, Paget, Todd, and Bowman, and others equally eminent; and yet, may not all these be denominated dental literature, and is not their study quite as much the legitimate duty of the dentist, as is the perusal of Harris's Practice?

Being a dental practitioner, these views are put forth, not in a fault-finding spirit, nor for the purpose of bringing discredit upon a profession we love, but with the desire that they may stimulate some to increased labor in the field of dental usefulness.

A NEW AND CHEAP THERMOSCOPE.

BY GEORGE E. HAYES.

THOSE of your readers who use the vulcanite, and who are troubled with the breaking of thermometers, will be glad to learn of a simple and cheap substitute which will answer in case of emergency. I do not anticipate that it will supersede the mercurial thermometer. Nothing yet discovered at all approaches that instrument in accuracy of result, or the ease with which its indications are read, but it is a great annoyance when engagements are pressing and the dentist finds himself compelled to send off perhaps hundreds of miles to obtain the necessary repairs.

In experiments with the high-pressure valve-oven, it was discovered that when the temperature was taken from the outside of the copper vessel, the indications were precisely the same as when taken from the stone chamber inside. I now propose to take advantage of that fact in a manner that will enable every dentist to prepare a thermoscope for himself at a moment's warning, or, still better, to keep a supply on hand.

An alloy composed of ten parts tin, seven parts lead, and two parts bismuth (the ingredients being pure) will fuse precisely at 320°. This may be prepared and tested in a common iron spoon over a spirit-lamp. When formed into small bars or rods, like the Britannia-man's solder, the size of a small wire, it is in the proper form for use. When the end is pressed slightly against the copper vessel, it will begin to soften at 300°; at 310° the metal forms into a head upon the rod; while at 320° fusion takes place. At a higher heat, the same succession of phenomena takes place upon the base of the thermometer case, so that a few experiments will enable any one to fix a scale, in his own mind, for any range desired.

These thermoscopic tests enable the operator to conduct the process with just the same certainty as when the thermometer is relied upon. In addition to that of sight, however, the sense of touch is required to read the indications. In this respect nothing known to science equals the mercurial column in the glass tube. For in proportion to the number of the senses required to determine a result, are the chances for error multiplied.

BUFFALO, NEW YORK, October, 1861.

RATIONALE OF TOOTH DISCOLORATION.

BY C. P. FITCH.

IN attempting a somewhat critical examination of this subject, it would be more strictly correct to employ the term coloration instead of discoloration, when speaking of various shades of tooth color. Discoloration is a conventional term, used to denote a departure from an accepted or recognized normal type of color. What particular shade or hue of color constitutes this normal or healthy type, is not so easy of definition; for the healthy type most certainly varies on a scale of shades between two points, somewhat extended as regards limitation.

There are certain shades of teeth connected with certain temperaments; temperament being but another term to designate the manifestation of certain forces which superintend and control the development and perpetuity of the entire organism. With a modification of these forces there is a corresponding tooth structure, producing a definite tooth color; each structure having its own appropriate color, which is (in reference to that particular tooth) a normal or healthy type. The nervo-sanguineous, nervo-bilious, and bilious lymphatic, and so on, running through a great variety of idiosyncrasies of temperament, have their appropriate yet difinite complexion of tooth; each one slightly differing from every other in color, size, and texture, and yet all strikingly similar. Age, sex, and development also modify the type.

Color, strictly speaking, is a property of light; or, in other words, is the result of a disturbing influence exerted upon the undulations of light, exhibiting the several rays of which light is composed.

There are three essentials necessary for the production of color, viz.: light; a disturbing agent or medium; and a visual organ connected with intelligence. If either essential be wanting, color is *non est.*

By some, light is considered a substance; by others it is supposed to be a subtile ether, affecting all bodies by its vibrations or undulations. Solar light is not homogeneous, but is composed, according to the Newtonian theory, of rays, yielding several primary colors, as red, orange, yellow, green, blue, indigo, and violet; the image thus produced in the decomposition of light, by the prism, is called the solar spectrum. But more recent investigations, by Brewster, seem to establish the fact that there are but three primary colors in solar light—red, yellow, and blue; the remaining four are produced by the mixtures in different, yet definite proportions of the primary rays. Indeed, it is maintained that these primary colors extend over the entire spectrum, each one manifesting itself at a particular part of the spectrum more intensly than at any other. Thus, the red rays are intensified at the lower part, the yellow near the centre, and the blue near the upper part of the spectrum. The other colors crop out between and beyond the primary ones, as the result of their commingling. Thus, in the solar spectrum, there are three simple superimposed spectra upon each other.

The rays of solar light produce several distinct classes of results, viz.: illumination, calorification, and those denominated chemical—the chemical being the most, and the heating rays the least refrangible. The heating rays are the red, the illuminating, near the yellow, and the chemical, at the extreme right on the outside of the violet.

The harmony of motion existing among the undulations of light is disturbed by material substances. Light is thus reflected, absorbed or arrested, refracted, decomposed, and polarized. These several ways in which matter disturbs the vibrations of light produce the various shades of color; or, in other words, certain rays are thrown back to the eye, and the others are arrested or pass through the substance upon which they fall. Just those rays are thrown upon the optic nerve which constitute a recognized color. The other rays are lost to vision. White is the result of a reflection of all the rays; while black is that of their arrestation. Thus is produced the endless variegation of color which surrounds man with beauty and splendor in his earthly estate. There are a few persons in every community who have no distinct perception of color. They are color blind. These unfortunate ones have no appreciable faculty to respond to the appeals of magnificence, coruscating all about them. Others are wanting in the recognition of some one or more particular shades of color. To all such, the teeth are nearly of the same complexion. It is quite unfortunate for any of this class to ever engage in any employment requiring a nice discrimination of color; especially is it so for such to embark in the dental practice.

Having thus enumerated some of the modifying and casual conditions of color, I will endeavor, briefly, to consider more directly the subject under discussion.

Metastasis, or change, is a primal law pervading the entire universe of life; indeed, it holds carnival in the lowest strata of the mineral kingdom. Animate and inanimate alike feel the touch of this universal law or force. Stasis, its opposite, as applied to the vegetable or animal world, is the significant language of death. The metastatic law impresses alike all organs and textures of the human body, extending even to the lowest in the scale of vitality; those highest in the vital scale responding more quickly to its action. The teeth being endowed with a vital life, although feeble, yet sufficient for the general conservation of their structure, uniformly, though slowly, yield to the prevalence of this primal law. Some physiologists assert that the entire body changes once in seven years. The endos and exosmotic currents or streams of supply and waste are ever introducing new conditions which must inevitably modify, to a certain extent, the complexion of tooth structure, though the transition stage be stealthy and imperceptible at the precise time of its occurrence.

The quantity and quality of fluid penetrating the tooth, the molecular arrangement of pabula in its structure, the passage of this ingesta through its tubuli, and the changes wrought upon the mass while in transitu, produce, by reflection, arrestation, refraction, and decomposition of light,—all the variations of tooth color. Where textural or tubular changes are rapid, color varies equally quick. Whenever disease, from whatever cause, furiously assails the periodonteum or endodonteum, these structures are more or less disturbed in their functional acts, or entirely destroyed. The product arising from a disturbance or destruction of these membranes frequently colors the tooth very much, the color being due to an interference with the undulations of light.

The chemical rays of solar light many times have an indirect coloring effect upon some of the constituents of a tooth, determining molecular structure during the later formative processes. It is not so easy to determine how these rays exert their coloring influence, or the precise condition which will best promote their action. Neither is it an easy task to determine or detect the minute arrangement of structure necessary to produce a given color. But that all variations of color depend upon the arrangement of the atoms of matter, producing opacity, density, transparency, fluidity, etc., is most clear. Structural or surface change, then, however slight, has a direct disturbing influence upon this highly sensitive ether, constituting the essence of light and the source of all color.

Human teeth have a definite structure, comprising enamel, dentine, and cementum. Each division has a structure peculiar to itself, composed of certain atomic elements, definitely arranged, constituting a healthy or normal tooth tissue. The enamel is very similar in structure to that of crystallization. It is more dense then dentine; having, I believe, at least a nervous circulation, though as yet undetected, otherwise than made patent to the residing intelligence, whenever its substance is impressed unfavorably by foreign influences or abnormal processes. The dentine has a tubular and intertubular structure; while the cementum is more analogous to bone, having canuli and canaliculi interspersed through its substance.

From these considerations we may deduce, at least, some of the modes in which color may be modified. 1st. The nature of tooth structure itself, or the atomic proportions of matter entering into its structure, modify color—as, the removal of a few atoms of lime from a given compound containing definite proportions of magnesia, lime, phosphorus, animal matter, and water would entirely change the complexion of that body.

Again, color is modified by molecular or atomic arrangement; as, for instance, particles of matter arranged side by side forming cylinders, or assuming an hexagonal shape, etc., will reflect from their ends very different rays than those reflected from their sides or convex surfaces.

Again, color is modified or changed by foreign particles permeating the intertubular structure, either by incorporation into its substance, or by infiltration between its particles; as an instance of permeation, rock salt immersed in a muddy liquid will be thoroughly saturated or impressed with the matter held in solution by the fluid; not only will the foreign matter find its way between the particles of salt, but the *substance* of every minute particle will be saturated with it.

Color may be still further modified by foreign particles superimposed upon the tubular walls, or held in solution by the fluid circulating in the tubes or net-work of the dentine. Any pigmentary matter is thus readily detected, as madder, giving the tooth a corresponding color. Glass arrests none or but few of the rays of light, but having an opaque substance, as quicksilver, upon its opposite side, will reflect all the rays.

Still another condition which causes a change in the complexion of teeth, is a consolidation of the dentinal tubuli. This change is not always regular and uniform in its commencement, progress, and termination, but frequently occurs after the thirtieth or fortieth year. We see it most fully exemplified in the white, pearly complexion of teeth appertaining to children, and the same teeth assuming a dark appearance as advance is made into the sear and yellow leaf of life.

From these considerations touching the structure of teeth and the conditions modifying their color, questions arise—as to the class of teeth susceptible of this process, and how far may we employ artificial means to affect or change favorably, the color of these organs? or, what conditions of teeth are susceptible of decoloration, and what agents are best suited for this purpose?

PHILADELPHIA, October 17th, 1861.

Entered, according to Act of Congress, in the year 1860, by JONES & WHITE, in the Clerk's Office of the District Court for the Eastern District of Pennsylvania.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

BY DRS. CH. ROBIN AND E. MAGITOT.

[Translated for the DENTAL COSMOS, from the "*Journal de la Physiologie de l'Homme et des Animaux,*" DR. E. BROWN-SÉQUARD, editor, by E. SUREAU.]

c. *Origin of the ivory.*

HAVING shown in the preceding divisions of this section what are the characteristics of the cells of the ivory, and the manner in which they appear, we will now proceed to examine how the dentine is produced by the aid and at the expense of these elements.

The cells of the ivory, disposed parallelly to each other in the amorphous matter which forms the surface of the bulb, are there subjected to a series of transformations, which change them from the condition of a lamina of ivory in the very heart of that first bed; these cells, thus arranged, are connected by their central ends with the tissue of the bulb, and by their peripherical ends with the small quantity of amorphous bulb-matter which extends beyond them, (pl. xii., fig. 1, *c.*) We will find in the conclusion of this description that a single range of dentinal cells exists at the commencement of the formation of the external shell of the tooth. The ulterior phenomena which occur in the body of the ivory are due to molecular modifications of its substance.

THE FIRST PHASES OF THE ORIGIN OF THE IVORY.—The transformation of the dentinal cells into ivory begins in those which occupy the simple summit of the bulb, or of each of the conical projections, if it be a multicuspid; and subsequently progresses by degrees toward the sides. Consequently, the cap of dentine, resulting from this progressive metamorphosis, is much thicker in the centre corresponding to the culminating point of the bulb summit, where the phenomenon has been longer in operation, than it is at the edges which terminate by growing gradually thinner. This thinness may be such that the ivory is reduced to only some thousandths of a millimetre in thickness, and appears in the form of a transparent membrane which is easily folded—for the change into ivory does not operate simultaneously upon the whole substance of the cells, but from the periphery to the central end, and therefore the depth of the edges of the dentine-cap is not usually equal to the length of the cells.

The microscopic examination of this cap of dentine is interesting in certain respects. When a fragment is detached with the scissors, and placed under the microscope, magnifying about two hundred diameters, we observe that the lamina of ivory, which is thick, dark and opaque at the side corresponding to the centre of the cap, becomes more thin and pale toward the free edge; the latter remains soft and flexible, although we can recognize the presence of canaliculi more completely developed in the thick parts. This flexible part bends easily without rupture, drawing with it some cells of the ivory not yet transformed or in process of union and transformation, (pl. xii., fig. 2, *b*.) It also draws with it some pieces of the bed of the substance of the bulb called the *membrana præformativa,* in the shape of very thin, pale pellicle, with edges irregularly broken, often filamentous and slightly striated. The thin edge of the cap of dentine is transparent, it refracts the light feebly, and allows us to observe the commencement of the development of the canaliculi. The length of these conduits is at this point equal to the thickness of the ivory, and they look like small blackish canals bounded by two distinct and dark lines which are very evident against the clear tint of the central part; these canals are of equal diameter throughout their whole extent. Situated parallelly to each other and almost perpendicularly to the surface of the cap, they show a diameter of between three thousandths and four thousandths of a millimetre. On the extreme points of the terminal edge of the cap there are canaliculi which have no greater length than width.

In proportion as we approach the thicker parts, the tubes are much longer without any change in their characteristics. Soon, however, when the ivory reaches a thickness of between five hundredths and eight hundredths of a millimetre, the tubes begin to be slightly inflected in one or more directions, and exhibit at the same time ramifications, which are much finer than the principal trunk. The extremities of both can then be seen at the exterior surface of the cap in the shape of small blackish points, when they are examined at a sufficient increase, (pl. xi., fig. 1, *a*.) On the deep or concave face of the cap, the appearance of the orifices is different; they are neither rounded nor regular as on the opposite face, but are irregularly star shaped. This arrangement is caused by little grooves, which start from the outline of the orifice and radiate toward the neighboring ones. These small radiating grooves, differing greatly in form and number, give the concave face a very peculiar appearance, (pl. xi., fig. 4, *a*,) which bears some analogy at first sight to the appearance presented by the osteoplasts upon preparations of fresh bone.

This analogy is only apparent, for besides their relative situation being very irregular and their number very considerable, the diameter of the canaliculi is at least three times less than that of the osteoplasts. In addition, the *grooves* which cause this appearance start from the circumference of a tubular orifice which passes through and through the membranous strip of dentine, and terminate *at the surface* of the latter. Consequently, they are not, as in the osteoplasts, *conduits* radiating from the periphery of a cavity hollowed out at the heart of a homogeneous substance, (fundamental substance of the bone.)

We cannot found any analogy of constitution between the bones and the teeth upon this disposition of the canaliculi of the nascent ivory. The comparison can be only very superficial, resting altogether in exterior appearance, and not based on really corresponding particularities of anatomic structure.

The largest orifices of the dentinal canaliculi belong to the most recently-formed tubes, that is to say, to those in the thinnest and most flexible part of the ivory. These have also the palest outline. The transparency of the strips of ivory in which they are found allows us also, by changing the focus, to follow each of the canaliculi through its entire length. We can then see all the tubes, corresponding to each orifice, passing through and through the dentine, and can in this way estimate their length. Observed in this manner, the ivory seems perforated with a multitude of openings, like button-holes, in those parts of it which are as yet not more than a few thousandths of a millimetre in thickness. At the other points, on the contrary, the orifices lead to a blackish canal, which is deeper and deeper, and whose flexuosities, occasionally very elegant, are lost in the depth of the ivory.

Arrangement of the elements at the level of the nascent ivory.—If now instead of examining the growing dentine in the transverse direction of the prepared strip, the fragment be disposed in such a manner as to enable us to examine its bulb-face, we will perceive an assemblage of the most interesting facts. By lowering the focus of the instrument three different times, three distinct aspects appear:—

1. The cells of the ivory are ranged regularly, the extremity containing the nucleus being turned toward the eye of the observer, (pl. xii., fig. 2, *c*.) Beyond the free edge of the cap, we pass insensibly from the cells of the ivory to the superficial amorphous bed of the bulb (membrana præformativa) involved in the preparation. The cells, thus observed, extend also beyond the edges of the most recently-formed portions of the ivory, and adhere but slightly to the dentine.

2. By lowering the focus a little below the bed of the preceding cells, the newly-produced ivory is visible, and is recognizable by the presence

of its canaliculi and by the canaliculi themselves, (pl. xii., fig. 2, *a.*) The extremely thin edge of this ivory is also lost in the amorphous matter of the bulb, where the cells are destined to continue its development. The dentine, in these conditions, exhibits a considerable refracting power, with a finely-granulated appearance and grayish color, which disappear in the thicker portions.

3. Finally, when the focus is lowered still more *so as to extend beyond the ivory,* we see one of the most beautiful and regular anatomic arrangements that can be presented to the observer. It is the continuous range of the prismatic cells of the enamel, (pl. xi., fig. 6, *d.*) They are seen either vertically by their extremities, transversely, or more or less obliquely. When examined vertically, they compose a bed the thickness of which is measured by the length of the cells, presenting an infinite number of very regular small polygons traced by the lines of juxtaposition of the cells, the form and dimensions of which indicate the prismatic shape and the breadth of the cells. Nothing can be more elegant than the range of cells, innumerable in quantity, and regularly and immediately juxtaposed. This bed of prisms adheres, on one hand, to the ivory, and covers the convex surface of the cap of dentine; while, on the other hand, it unites with the less-developed cells, which are awaiting their turn of development at the surface of the organ of the enamel.

The preceding constitutes an assemblage of anatomic facts, each of which can be verified without difficulty upon the appropriate pieces. These facts show the ivory in its different phases of evolution, and in immediate relations with the parts of the particular apparatus which contribute to its formation.

If we have clearly presented to the mind of the reader the condition of the first cap of dentine such as we have just described it, also that of the range of the cells of dentine at the surface of the bulb-tissue, and the condition of the cells beyond the circumference of the already formed ivory, it will not be more difficult to comprehend the method by which the genesis and development of the ivory is effected—a question which we have just compassed, and the intimate mechanism of which alone remains for us to examine. It must not be forgotten, and the following portion of this description will give us superabundant proof of the fact, that the production of the ivory, as far as a solid and resistant substance, is a phenomenon of the direct metamorphosis of the cells. As to the cells themselves, they very evidently grow by individual genesis, and are not the product of some other organ, as, for example, a secreted liquid is the product of the gland which discharges it.

As soon as the cells are arranged in a single bed, and have reached their complete development upon the culminating parts of the bulb, they immediately become at that point more adherent by their peripherical extremities, and offer a greater refracting power than through the rest of their extent, (pl. xi., fig. 1, *b*.) In consequence of their nearness to each other, the cells at the same time assume a prismatic form with four, five, or six sides, and tend to compose a homogeneous mass. These phenomena of metamorphosis, invading the cells from their peripherical to their central extremities, necessarily cause the nucleus to disappear gradually. The transformation into ivory continuing to progress, the cell ends by becoming, through its whole length, a small, homogeneous, hard mass, endowed with a very considerable refracting power, and it adheres to those near it, as we will indicate hereafter.

EXTENSION OF THE PRODUCTION OF THE IVORY UPON THE RADICULAR PART OF THE BULB.—The phenomenon commences in the cells occupying the summit of the bulb, and extends gradually to the cells of the periphery—thus the cap of dentine is gradually enlarged, and covers an extent which increases progressively from the coronal part of the bulb even to the extremity of the radicular part. The exterior configuration of the tooth is now completely determined, and from this time also the formation of all cells destined to the ivory ceases. It is by this series of processes that the bulb is completed, and that the central cavity of the tooth is formed. At this epoch, and henceforward, we no longer meet the least trace of cells on the surface of the bulb or on the external face of the ivory. The complete disappearance of the cells coincides with the completion of the external shell of the tooth.* We find only, on one hand, the proper tissue of the bulb, and on the other, the substance of the ivory, which we always obtain by scraping into thin beds, perforated from space to space by the canaliculi, the formation of which will be considered hereafter. The dentine is thus found in immediate contact with the tissue of the bulb, and continues there during the whole period that the tooth remains in the alveolus, that is to say, so long as the bulb is not atrophied.

The origin of the ivory consists in a gradual cohesion with a change into the consistent and homogeneous condition of the dentinal cells—phenomena which operate on the cells, severally, from the peripherical to the bulbular extremity, and in the cells, collectively, from the summit of the bulb to its radicular part, (pl. xi., figs. 2, 3, and 6.)

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* It is important to observe that this is only applicable to the teeth which cease to increase at a given time and do not last as long as life, as occurs in the incisors of the rodentia. We will return to this fact in a special work upon the evolution of the teeth of those animals. In them, through life, there is a continuous bed of cells of dentine between the ivory and bulb, from the summit of the latter to the deep edge of the incisors and a little beyond. These cells, of which we have already spoken, are generally in the adult rabbit three or four hundredths of a millimetre in length, and five or six thousandths of a millimetre in breadth. Although very flexible, they alter less rapidly than the cells of the fœtus. passing less quickly into the spheroidal condition: they are a little more granulated than in the latter, and the granulations become more distinct after death. The nucleus, which is often spherical, and five or six thousandths of a millimetre in width, is a little less pale than in the embryo.

When the alteration into the solid condition is once effected, the cell becomes forever unrecognizable—the body having gradually changed from the condition of a soft substance to that of ivory, and the nucleus becomes atrophied during the general invasion.

(To be continued.)

EDITORIAL.

DENTISTRY AND MEDICINE.

It seems to us that some dentists do not exactly understand what their true relation is to practitioners of medicine or even their patients, with regard to medical advice. We contend that it is the duty of every dentist to become as fully acquainted with medicine as possible, that he may the better understand his subject in that relation, but we do not wish to be understood that every dentist should study medicine in every minutia, or take the degree of M.D., but he should know enough about it to understand where his dental practice stops. It has been said in an earlier history of our profession, that a dentist who understood medicine and surgery, had as much right to practice the one as the other. This we do not doubt, but a proper respect for the medical practitioner, for himself, and the patients for whom he prescribes should limit his practice to within such bounds as would secure to his patient the greatest amount of good that could arise from a concentration of his science and skill upon a given specialty. On a former occasion, when speaking on this subject, we remarked that an intelligent dentist would often send his patient to the doctor for the good of his *teeth*, and in like manner the intelligent practitioner of medicine would often send his patient to the dentist for the good of the *body*. Now the whole secret of the intercourse of the two practitioners lies here, and both should be equally intelligent to understand each other, and withal, *honest*. It is not sensible on the part of a medical man to treat with disrespect the opinion of a dentist with regard to the influence of the teeth on the system, nor is it respectable for a dentist to attempt to turn to ridicule the opinion of the medical man if he discovers that he is not as well posted upon the teeth as himself; it is the duty of the one to treat the other with proper consideration, and the one to render as much service to the other as possible for the good of the patient. This is all the *ethics* that either requires. If a medical practitioner persists in treating a patient for neuralgia because it is intermittent, and the dentist informs him and the patient that it is nothing but toothache, it is absurd; and if the dentist persists in treating teeth by drilling them open or by extraction for a neuralgic patient, he is equally foolish. A dentist should not allow himself to be controlled by the confidence a patient has in him with relation to medicine, as he can no more judge who he should employ to treat him, than know what medicine he most requires, and a dentist who prescribes under such circumstances is playing false to his patient. We do not even prescribe lime-water for a patient without requiring him to first consult his medical adviser. A number of cases have come to our knowledge lately, where dentists have had the confidence of patients in an unlimited degree, and medicines have been administered in a most shameful manner. It seems as though large cities, with all their intelligence, are the hot-beds of the worst forms of *quackery*.

J. D. W.

LIABILITIES TO DENTISTS.

THE comments made in connection with the Hull decision lead us to refer to a singular decision in one of the English courts on the liabilities to dentists, which was taken from the *London Lancet*, published in the July number of this magazine, and subsequently republished in the *Dental Review* of London.

In this case, as our readers no doubt remember, a lady called upon a dentist, and made arrangements to have an entire set of teeth constructed; at a subsequent appointment the models were taken, and when the teeth were ready to be inserted, she was notified of the fact; being sick at that time, however, she addressed a note to the gentleman, thanking him for his kindness, but excusing herself from keeping the appointment on account of the state of her health. Soon after this the lady died, without having the teeth inserted. A claim was presented by the dentist to the administrator of her estate for the payment of the price charged for the teeth, twenty guineas. This claim having been objected to by the administrator, suit was brought against the estate.

The justice, before whom the case was presented, notwithstanding the fact that the note of the lady was submitted as evidence of the validity of the claim, was on the point of nonsuiting the plaintiff, because there was not a sufficient memoranda of writing within the statute of frauds, when the plaintiff's counsel suggested that he might recover under the count for work, labor, and materials.

Upon this action was taken, the plaintiff's counsel maintaining that when the skill of the artist was the chief ingredient in the value of the article, he could recover for his work, labor, and materials. He also contended that the letter of the deceased made up a contract in writing within the statute of frauds.

The judge, still contending that there was no written contract within the statute of frauds, said, in addition, that this was not a contract for work, labor, and materials, but for chattel, to be sold and delivered; the chattel had not been delivered, and a nonsuit ought to be entered. Two other judges coinciding with this opinion, it was ruled absolute to enter a nonsuit.

Taking into consideration that a decision such as this becomes a precedent for subsequent cases, and then remembering the importance that is attached to precedent decisions in courts of law, it will be readily perceived that a vital principle is involved in this case, and it is somewhat surprising that our contemporaries in England have not deemed the matter of sufficient importance to offer a dissenting voice to a verdict so entirely at variance with justice, and in opposition to their rights and interests. Professional men, generally, have an antipathy to anything like lawsuits; and there is an almost invariable disposition to present a patient with a receipt in full for services rendered rather than have recourse to litigation. In this case the person interested was not influenced by such considerations, and although the decision at present affects him more than any one else, it is one which, sooner or later, may be brought to bear upon other members of the profession, not only in Great Britain, but also in our own country, for the decisions of English courts are as apt to be cited as authority on this side of the Atlantic as they are on the other.

We do not know what the practice of the dental profession has been in England with regard to written agreements between practitioners and patients, but infer that it is as unusual there as here, where it is seldom, if ever, done. Such a thing, indeed, would be attended by a great deal of trouble and annoyance. Unpleasant as it may be, this decision, however, appears to make such arrangements imperatively necessary in England on account of a peculiar statute controlling such matters.

The position assumed by the judge, that a set of teeth are to be regarded as chattel, and that the amount due on them cannot be recovered on the count of work, labor, and materials, appears to one, who makes no pretensions to legal knowledge, a very singular decision.

According to Blackstone, "*chattels personal* are things movable, as animals, furniture of a house, jewels, corn, etc."

Each and all of these things are as valuable and as useful to one person as to another.

Such, however, is not the case with a set of teeth; they are only intended for, and can only be used by, the person for whom they were made. And every point that makes a set of teeth valuable to such a one, the adaptation of the plate, the shape, color, and arrangement of the teeth, renders it, with the exception of the intrinsic value of the plate, worthless to every one else.

In the construction of an artificial denture, the skill of the artist is the chief ingredient in the value of the article; and in equity he ought to be able to recover for his work, labor, and materials.

Inferring that the practitioner most interested in this case is a man of probity and honor, and therefore that the claim was a just one, we think, with all due respect to our professional brethren in England, that a principle is involved in this decision affecting their rights and interests, which, as a profession, they should have thoroughly tested. J. H. M'Q.

Removal.—Dr. J. H. McQuillen desires to inform his correspondents and professional friends at a distance that he has removed to No. 1112 Arch Street.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

Dental Register of the West—October.

"Bleaching.—We are glad to see that the subject of bleaching teeth occupied, to a good extent, the attention of the late Convention at New Haven. It is an important and intricate subject; and that it is beginning to elicit the attention of the profession is evidence of progress. We are aware that individuals have given the matter some care; but, as a profession, we certainly do not understand the subject.

"In looking at this subject, the first inquiry ought to be the chemical characteristics of the coloring materials that are to be decomposed. Without, at least, some general knowledge in this direction, all our efforts will be empirical. Now it may be sufficient, for our present purpose, to state that most if not all of the coloring matters which concern the dentist are organic compounds. Most of them contain carbon, hydrogen, oxygen, and nitrogen. And it is scarcely necessary to remark that their color is dependent on their composition. If one of their elements be removed, or if their proportion be much varied, the color will be changed or obliterated.

"The object to be aimed at in bleaching, then, is to decompose the coloring compound, by some agent or agents for which one or more of its elements have a strong affinity. Of course, the agent of decomposition must have an affinity for at least one element of the coloring compound stronger than that by which it is held in the compound.

"Bearing these things in mind, we can understand the action of some of the best known bleaching agents.

"Sulphurous acid, ($S\,O^2$) which is always formed when sulphur is burned, and is commonly called sulphur smoke, has a powerful affinity for oxygen, and usually bleaches by taking that element from the coloring compound. This acid is extensively used by bleachers of straw millinery.

"Chlorine, which has been termed 'the great bleaching agent,' as is well known, has a strong affinity for hydrogen, and sometimes bleaches by taking this element from the coloring compound, and sometimes by taking hydrogen from the water present, thus liberating the oxygen, which in its nascent state is able to decompose the coloring matter by taking its hydrogen and carbon. In many instances of chlorine bleaching, these processes take place simultaneously, and are not in the least incompatible with each other.

"Oxygen, as it exists in the atmosphere, sometimes bleaches, (and sometimes dyes,) by virtue of its affinity for elements or compounds contained in the colored matter.

"Cyanide of potassium, as recommended in the September number of the *Dental Cosmos,* by Dr. Kingsbury, bleaches by virtue of the affinity of its cyanogen for hydrogen. Cyanide of potassium is readily decomposed. Its solution undergoes 'spontaneous decomposition,' even in closed vessels. Its cyanogen, with the energy incident to the nascent state, is able to remove hydrogen from almost any organic compound. Its mode of bleaching is exactly the same as that of chlorine.

"Dr. K.'s caution in regard to the poisonous properties of the cyanide is worthy of attention; and the doctor, as well as all others, should know that it bleaches only by forming hydrocyanic acid, the most deadly poison known.

"But it is not our intention to write an essay on the subject of bleaching now and here. We set out merely to tell how glad we are that the subject is eliciting increased attention. W."

DENTAL REVIEW, LONDON—JULY.

SYMPATHETIC IRRITATION.—(Concluded from page 160.)—"Only a short time ago, the following case occurred in my own practice:—

"CASE 17.—'Mrs. F. H. called on me for advice, having suffered severely for the last fortnight with violent pain in the right temple, extending down the neck, at times affecting the whole of that side of the face, and accompanied with darting pains in the eyeball. The only relief she obtained from her sufferings was by the application of ice to the side of the head, and by holding cold water in the mouth. At the time of her visit the patient was in no pain, but had had a severe attack that morning. She had not suffered from her teeth during this neuralgic affection. On examining the mouth I found the lower dens sapientiæ, on the right side, very much decayed on its anterior and external surface. On tapping this tooth smartly there was no pain; yet I felt convinced, from the state of the tooth and the inflamed condition of the gum, that it was the exciting cause of the neuralgia. The patient very reluctantly consented to the extraction of the tooth. At the moment of the operation she experienced a violent paroxysm of pain over the whole of the right side of the head, which lasted several seconds: there was no pain in the part from whence the tooth was extracted. The operation was attended with a moderate amount of hæmorrhage, and the pain soon ceased. The patient has since continued perfectly free from all symptoms of neuralgia.'

"Similar cases to the above have been recorded by other writers, but those I have mentioned illustrate the ophthalmic affections which the teeth most frequently set up. These are amaurosis, strabismus, and spasmodic affections, or loss of power in the eyelids. The strabismus and the amaurosis are characterized by coming on suddenly, and the latter also by the absence of structural changes in the eye.

"It is most important to remember that in connection with these ophthalmic affections, it is by no means necessary that the diseased teeth should be the actual seat of pain.

"The last subject to which I shall call your attention is, the influence which a morbid condition of the teeth is capable of evercising over the ear. One of the commonest examples of sympathy between the ear and the teeth is instanced in the sensations which are felt in the teeth when certain sounds grate upon the ear—a sensation commonly known as a setting the teeth on edge. It frequently happens that decayed teeth bring on a sudden attack of pain in the ear, which is often referred to the effects of cold. This sympathy between these organs is often alluded to by the older writers, and even formed the basis upon which they founded their treatment. Thus Ambrose Paré, after enumerating several remedies for toothache, tells us that if these do not succeed, to drop oil of castoreum or oil of cloves into the ear, and use vesicatories under the ear. The following cases illustrative of this part of my subject came under the notice of Mr. Harvey, at the Dispensary for Diseases of the Ear.

"CASE 18.—'H. L., aged twenty-two, a lawyer's clerk, had suffered from neuralgic pains in his ear for more than three years: they were accompanied with an occasional fetid discharge. The neuralgic paroxysm generally lasted for some hours. The principal seat of pain was directed toward the last molar tooth on the left side, and the dens sapientiæ was found to be defective. After this tooth was extracted—an operation which was performed with some difficulty—the discharge stopped, and the patient lost all his neuralgic pains. Until the teeth were examined the pain was attributed to rheumatism.'

"CASE 19.—'Mrs. H., a delicate female, had been the subject of neuralgia in the ear and face, accompanied with deafness, for twelve months. Upon examining the mouth the two last molar teeth were found to be defective on the same side. These teeth were extracted, and some medical treatment adopted: she soon recovered her hearing, and permanently lost the neuralgia.'

"I have thus, sir, endeavored to bring before the meeting illustrations of those nervous affections which may arise from the presence of irregular or diseased teeth in the mouth. I am aware that there are many other disorders even of a more serious and dangerous character than those to which I have called your attention which originate in a similar manner; but in those cases the connection between the disease and its exciting cause is so strongly marked, that even the most superficial observer cannot fail to connect them together. If inflammation spreads from a tooth and involves the neighboring structures, yet the state of the tooth clearly points to the original seat of the disorder; or if a tumor arises, it is found to commence in the immediate vicinity of the diseased tooth. This is not the case with affections which are propagated through those intricate combinations of the nervous fibres which I pointed out at the commencement of the present paper. The cases I have recorded sufficiently prove the existence of these peculiar forms of tooth disease, and strongly suggest the propriety, in all doubtful cases, of carefully investigating the condition of the dental organs."

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BRITISH JOURNAL OF DENTAL SCIENCE—AUGUST.

"PRACTICE OF HARDENING AND TEMPERING STEEL.—It may perhaps be truly said, that upon no one subject connected with mechanical art does there exist such a contrariety of opinion, not unmixed with prejudice, as upon that of hardening and tempering steel; which makes it often difficult to reconcile the practices followed by different individuals in order to arrive at exactly similar ends. The real difficulty of the subject occurs in part from the mysteriousness of the change; and from the absence of defined measures, by which either the steps of the process itself, or the value of the results when obtained, may be satisfactorily measured; as each is determined almost alone by the unassisted senses of sight and touch, instead of by those physical means by which numerous other matters may be strictly tested and measured, nearly without reference to the judgment of the individual, which in its very nature is less to be relied upon.

"The excellence of cutting tools, for instance, is pronounced upon their relative degrees of endurance, but many accidental circumstances here interfere to vitiate the strict comparison; and in respect to the measure of simple hardness, nearly the only test is the resistance the objects offer to the file, a mode in two ways defective, as the files differ among themselves in hardness; and they only serve to indicate in an imperfect manner to the touch of the individual, a general notion without any distinct measure, so that when the opinion of half a dozen persons may be taken, upon as many pieces of steel differing but slightly in hardness, the want of uniformity in their decisions will show the vague nature of the proof.

"Under these circumstances, instead of recommending any particular methods, I have determined to advance a variety of practical examples derived from various sources, which will serve in most cases to confirm, but in some to confute, one another; leaving to every individual to follow those examples which may be the most nearly parallel with his own wants. There are, however, some few points upon which it may be said that all are agreed, namely—

"The temperature suitable to forging and hardening steel differs in some degree with its quality and its mode of manufacture; the heat that is required diminishes with the increase of carbon:

"In every case *the lowest available temperature* should be employed in each process, the hammering should be applied in *the most equal manner throughout*, and for cutting tools it should be continued until they are nearly cold:

"Coke or charcoal is much better as a fuel than fresh coal, the sulphur of which is highly injurious:

"The scale should be removed from the face of the work, to expose it the more uniformly to the effect of the cooling medium:

"Hardening a second time without the intervention of hammering is attended with increased risk; and the less frequently steel passes through the fire the better.

"In hardening and tempering steel there are three things to be considered—namely, the means of heating the objects to redness, the means of cooling the same, and the means of applying the heat for tempering or letting them down. I will speak of these separately, before giving examples of their application.

"The smallest works are heated with the flame of the blow-pipe, and are occasionally supported upon charcoal; but as the blow-pipe is used to a far greater extent in soldering, its management will be described in the chapter devoted to that process.

"For objects that are too large to be heated by the blow-pipe, and too small to be conveniently warmed in the naked fire, various protective means are employed. Thus an iron tube or sheet-iron box inserted in the midst of the ignited fuel is a safe and cleanly way; it resembles the muffle employed in chemical works. The work is then managed with long forceps made of steel or iron wire, bent in the form of the letter U, and flattened or hollowed at the ends. A crucible or an iron pot, about four to six inches deep, filled with lead and heated to redness, is likewise excellent, but more particularly for long and thin tools, such as gravers for artists, and other slight instruments; several of these may be inserted at once, although toward the last they should be moved about to equalize the heat; the weight of the lead makes it desirable to use a bridle or trevet for the support of the crucible. Some workmen place on the fire a pan of charcoal dust, and heat it to redness.

"Great numbers of tools, both of medium and large size, are heated in the ordinary forge fire, which should consist of cinders rather than fresh coals; coke and also charcoal are used, but far less generally; recourse is also had to hollow fires, the construction of which has been previously explained; but the bellows should be very sparingly used, except in blowing up the fire before the introduction of the work, *which should be allowed ample time to get hot*, or, as it is called, to '*soak*.'*

"Which method soever may be resorted to for heating the work, the greatest care should be given to communicate to all the parts requiring to be hardened a *uniform* temperature, and which is only to be arrived at by cautiously moving the work to and fro to expose all parts alike to the fire; the difficulty of accomplishing this, of course, increases with long objects, for which fires of proportionate length are required.

"It is far better to err on the side of deficiency than of excess of heat; the point is rather critical, and not alike in all varieties of steel. Until the quality of the steel is familiarly known, it is a safe precaution to commence rather too low than otherwise, as then the extent of the mischief will be the necessity for a repetition of the process at a higher degree of heat: but the steel, if burned or overheated, will be covered with scales, and, what is far worse, its quality will be permanently injured; a good hammering will, in a degree, restore it; but this in finished works is generally impracticable.†

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*It is a common and excellent practice among the Sheffield workmen to use coke both in forging and hardening steel goods They frequently prepare it for themselves, either upon the forge hearth or in a heap in the open yard. In that celebrated town a decided preference is given, for the purpose of hardening, to the light coke of the Deepcar coal, which is obtained about eight miles northwest of Sheffield, although, for ordinary use and for forging, this is considered an inferior kind of coal, and of light quality; other workmen prefer charcoal for hardening.

† It is argued by some, that by heating pieces of steel to different degrees, before plunging them into the water, the one piece attains full hardness, the next the temper of a tool fit for metal, another of a tool fit for wood, a fourth that of a spring, and so on. That this view is not altogether without foundation, appears in the fact that if the end of a piece of steel be made entirely hard, the transition is not quite immediate from the hard to the soft part; and Mr. Ross, in making the dividing points, for his dividing-engine, hardens the end of a longer piece of steel than is required, and forms the point upon the grindstone, exactly at the part where the temper suits, without the steel being let down at all; a practice first employed by Mr. Stancliffe, a workman formerly employed by the celebrated Ramsden. In hardening by this method, however, without tempering, the scale of proper hardness is confined within such extremely narrow limits as to be nearly useless; thus it frequently happens that in a number of tools heated as nearly alike as the workman could judge, some few will be found too soft for any use, although they were all intended to receive the ordinary hardness, so as to require letting down, as usual with those tools exposed to violent strains or blows, such as screw-taps, cold chisels and hatchets, although many tools for metals, used with quiet and uniform pressure, are left of the full hardness for greater durability.

With the *excess* of heat, beyond *the lowest that will suffice*, the brittleness rather than the useful hardness of tools is increased; and when *no excess* of heat is employed beyond that *absolutely requisite* for hardening in the usual manner, the steel does not appear to be injured, and the colors on its brightened surface that occur in tempering are an excellent, and, in general, sufficiently trustworthy index of the inferior degrees of hardness proper for various uses.

"Less than a certain heat fails to produce hardness, and in the opinion of some workmen has quite the opposite effect, and they consequently resort to it as the means of rapid annealing, not, however, by plunging the steel into the water and allowing it to remain until cold, but dipping it quickly, holding it in the steam for a few moments, dipping it again, and so on, reducing it to the cold state in a hasty but intermittent manner.

"There is another opinion prevalent among workmen, that steel which is '*pinny*,' or as if composed of a bundle of hard wires, is rendered uniform in its substance if it is first hardened and then annealed.

"Secondly, the choice of the cooling medium has reference mainly to the relative powers of conducting heat they severally possess; the following have been at different times resorted to with various degrees of success: currents of cold air; immersion in water in various states, in oil or wax, and in freezing mixtures; mercury and flat metallic surfaces have been also used. Mr. Stodart recommended, as the result of his experiments, plain water at a temperature of 40° Fahrenheit. On the whole, however, there appears to be an opinion that mercury gives the greatest degree of hardness; then cold salt and water, or water mixed with various 'astringent and acidifying matters;' plain water follows; and, lastly, oily mixtures.*

"A so-called natural spring is made by a vessel with a true and a false bottom, the latter perforated with small holes; it is filled with water, and a copious supply is admitted beneath the partition; it ascends through the holes, and pursues the same current as the heated portions, which also escape at the top. This was invented by the late John Oldham, Esq., Engineer to the Bank of England, and was used by him in hardening the rollers for transferring the impressions to the steel plates for bank-notes.

"Sometimes, when neighboring parts of works are required to be respectively hard and soft, metal tubes or collars are fitted tight upon the work, to protect the parts to be kept soft from the direct action of the water, at any rate for so long a period as they retain the temperature suitable to hardening.

"The process of hardening is generally one of anxiety, as the sudden transition from heat to cold often causes the works to become greatly distorted, if not cracked. The last accident is much the most likely to occur with thick massive pieces, which are, as it were, hardened in layers, as although the external crust or shell may be perfectly hard, there is almost a certainty that toward the centre the parts are gradually less hard; and when broken, the inner portions will sometimes admit of being readily filed.

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* I find but one person who has commonly used the mercury; many presume upon the good conducting power of the metal and the non-formation of steam, which causes a separation betwixt the steel and water when the latter is employed as the cooling medium. I have failed to learn the *reason* of the advantage of salt and water, unless the fluid have, as well as a greater density, a superior conducting power. The filemakers medicate the water in other ways, but this is one of the questionable mysteries which is never divulged; although it is supposed that a small quantity of white arsenic is generally added to water saturated with salt. One thing, however, may be noticed, that articles hardened in salt and water are apt to rust, unless they are laid for a time in lime-water or some neutralizing agent.

With plain water an opinion very largely exists in favor of that which has been used over and over again even for years, provided it is not greasy; and when the steel is very harsh, the chill is taken off plain water to lessen the risk of cracking it; oily mixtures impart to *thin* articles, such as springs, a sufficient and milder degree of harshness, with less danger of cracking, than from water; and in some cases a medium course is pursued by covering the water with a thick film of oil, which is said to be adopted occasionally with scythes, reaping-hooks, and thin edge-tools.

Having experimented upon all these means, I am induced fully to acquiesce in Mr. Stodart's recommendation of plain cold water for general purposes; except in the case of thin elastic works, for which oil, or oily compositions, are certainly more proper.

(To be continued.)

BRITISH JOURNAL OF DENTAL SCIENCE—AUGUST.

"IMPORTANT HULL DENTIST CASE.—In the Vice-Chancellor's Court, London, on Wednesday last, the case of Mosely *v.* Abel came on before Sir W. P. Wood.

"Sir Hugh Cairns and Mr. Charles Wood moved on behalf of the plaintiff for an injunction to restrain the defendant from practicing the profession or business of a surgeon dentist, or any branch thereof, at Leeds, York, Harrogate, Wakefield, or Skipton, or at any place in or within ten miles of the town and county of the town of Kingston-upon-Hull, or the city or county of York, or the city or county of Lincoln. The question turned upon the meaning of the term 'city and county of York,' and arose under the following circumstances: The plaintiff had for some years practiced as a dentist in Yorkshire, being in the habit of visiting the various places throughout the county, either by himself or by his assistants and agents, his residence and headquarters being at Hull. The defendant had been employed by the plaintiff as an assistant. In January, 1859, an agreement was executed between the plaintiff and defendant, by which the defendant covenanted to become an assistant to the plaintiff for five years, as from July, 1858, that he would not during that term, directly or indirectly, practice as a dentist, except for the benefit of the plaintiff, with other provisions not material. The agreement also contained a covenant by the defendant, that for seven years after the determination of the agreement he would not, directly or indirectly, by himself or by any agent or assistant, or otherwise for the benefit of himself or any other person, practice or carry on the profession or business of dentist, or any branch thereof, 'in or within ten miles of any of the several places and counties following, viz.: the town and county of the town of Kingston-upon-Hull, the city and county of York, the city and county of Lincoln, and the county of Stafford.' A penalty of £100 per day was imposed upon the defendant as liquidated damages for breach of the agreement and its covenants. The agreement was determined by notice from the plaintiff, dated the 8th of February, 1861. The defendant had lately commenced practice as a dentist at Leeds and other places in Yorkshire, and had advertised in the local papers his arrangements for attending at Harrogate, Wakefield, and Skipton. The plaintiff filed his bill to restrain the defendant from practicing at the places specified in the notice of motion and generally within Yorkshire. The bill also sought to enforce the penalties stipulated in the agreement in case of breach of covenant.

"In support of the motion, it was contended that the term 'city and county of York,' both in the popular and in the legal sense, included the whole of Yorkshire; and that there had been a clear breach of the agreement, and that there was ample jurisdiction in the court for restraining such breach, while the agreement was not open to any objection such as to induce the court to withhold relief.

"Mr. Rolt and Mr. Kay, for the defendant, contended that the term 'city and county of York' applied to York itself and the precincts, and did not include all Yorkshire. The defendant swore to his belief that the term was intended in the limited sense in the agreement, and that on this belief the agreement was signed by him. They also contended that the agreement was harsh and unreasonable in its terms, and harshly acted upon, and that no relief could be granted upon it in equity. At any rate, the court would construe it strictly against the person seeking to enforce it. By granting the injunction, the public would be deprived of the defendant's assistance, while they could not possibly get the benefit of the plaintiff's services, one man being wholly insufficient for the care of the teeth of all Yorkshire.

"Sir Hugh Cairns was heard in reply.

"The Vice-Chancellor said that there was no counter equity on the part of the defendant, nor could his notion of what was the effect of the expression used in the agreement be taken into account. He was entitled to have the question tried at law, and whatever might be the legal effect of the covenant, that must prevail. Looking at the words of the agreement, one would be led to conclude that all Yorkshire, and not merely the city of York, was included in the restriction. The words, however, were singularly placed, and there was a fair question to be tried. As to the extent of the area comprised in the covenant, it had been held that a covenant prohibiting a dentist from practicing in all London or Westminster was not too extensive, as people would be attracted to a dentist of reputation from all parts of London, even from Mile-end. But the case as to an entire county was by no means so clear. It was not a parallel case to that of London, and it was not clear that people would come to one particular dentist from all parts of a large county such as Yorkshire. Then again, there might be doubts as to the plaintiff being able to supply the place of dentist for a whole county and ten miles beyond it. He was not favorably impressed with the defendant's course of proceeding, which was, no doubt, adopted for the express purpose of getting the plaintiff's customers; but the question was altogether one of legal right. Upon the balance of convenience and inconvenience, he thought that it would not be right to stop the defendant's practice *in limine.* The motion for an injunction would, therefore, stand over until the legal question had been tried, with liberty for either party to apply."

The above case is presented in illustration of a principle, rather than on account of any interest in the parties concerned. The principle referred to is the folly, not to say injustice, of one practitioner exacting from another an agreement not to practice the profession in a given locality for a certain number of years after the expiration of all business relations between them.

For the credit of a profession that claims to be a liberal one, it is to be hoped that such arrangements are rarely proposed or entered into. Even when agreed upon, as in the present case, they are are almost invariably violated by one of the parties, and lead to criminations and recriminations which eventually terminate in lawsuits—contingencies that all properly constituted minds desire most devoutly to be relieved from.

While far from intending to defend one who has violated an agreement with another, we yet feel, on the other hand, impelled to condemn, in un-measured terms, the harsh restrictions contained in the agreement. No professional man has a *right* to dictate such terms. He can only serve a certain number of persons, and has no right to deprive the rest of the community of service more valuable, perhaps, than his own. The world certainly is wide enough for all, and those who honestly, ably, and persistently serve their fellows, should, and will meet with encouragement and reward.

London Dental Review—September.

"On the Reddening of Teeth. By Dr. Med. Leopold, Practical Dentist in Stuttgart.—A consideration of this interesting subject, which was introduced at the last meeting of the 'Central Society,' by Hr Fricke, in its anatomical and physiological aspects, has led me to entertain the following views with regard to it.

"If slowness in the changes required by nutrition and slight absorbent power are characteristics peculiar to bone tissue, they are much more so with regard to the teeth, which are more nearly allied to epidermoidal structures. The bones become red through the presence of blood or of certain red coloring matters, as the *rubia tinctorum*, which are used in the medical treatment of diseases of the bones. As a rule, the red color arises from the presence of the coloring matter of the blood, either in the blood-corpuscles, or set free in the serum. It is also thus with the teeth: tooth-tissue is not susceptible of true inflammation, nor is the passage of blood-corpuscles possible through the dentinal tubuli, which are so microscopically minute as to be only 0.0006 to 0.0001 of a line in diameter, the corpuscles being the $\frac{1}{300}$ of a line in breadth. When, therefore, a tooth becomes red, this can only take place by imbibition of the coloring matter of the blood dissolved in the serum; and this permeation of the dental tissue under normal conditions proceeds from the interior toward the periphery of the tooth, for the source of nutrition and the vegetative life of the tooth has its seat in the pulp; the latter, together with the peridental membrane in close connection with it at the apex of the root, being abundantly supplied with blood-vessels, on the existence of which these physiological changes are dependent. An external nutrient supply from the peridental membrane is physiologically if not exactly possible; yet it is very questionable, for the cementum in the normal state is not permeable, and, according to Kölliker's researches, it seldom contains Haversian canals and blood-vessels, and the presence of terminal dentinal tubuli is by no means constant. It is, therefore, evident that imbibition from the exterior of the tooth is not in accordance with physiological facts: moreover, the course and ramification of the dentinal tubes proceed from the pulp, commencing with open mouths on the parietes of the pulp cavity, and passing through the entire thickness of the dentine, as far as the enamel and the cementum. Besides, and this is all-important, the dentinal tubes in a healthy state contain a pale fluid, which, under diseased conditions, may easily impart a red appearance to the tooth, through the admixture of the coloring matter of the blood; and, as these canals exist in endless numbers, freely anastomosing with one another, the result is the impregnation with coloring matter, according to the quantity of the effusion and the extension of the inflammatory process. Suppose, for instance, the principal tubuli are alone infiltrated, the redness will thus present a more streaky or dotted appearance, because the chief tubuli ramify but little: if, on the other hand, all the tubuli, with their minutest ramifications are infiltrated, the tooth will present a saturated redness. The whole tooth may appear to be reddened, including the cementum and enamel; first, because of their transparency; and secondly, by reason of the terminal tubuli entering partially into the enamel and cementum, and there terminating either free or in loops.

"The above, in my opinion, is a correct representation of the manner in which teeth become reddened; a phenomenon, moreover, which is not an affection peculiar to the dental tissue, but presents itself less frequently here, owing to the peculiar anatomical structure of the part, than in other tissues of the body—as, for instance, in the eye.

"The coloring may vary from a rosy to a yellowish or bluish tint, according to the stage of the disease; for the coloring matter of the blood undergoes changes when it is no longer contained in the corpuscles. Whether the sanguineous exudation is capable of further organization remains to be determined.

"The teeth have been observed to be reddened after mineral-water cures, no doubt the effects of the salts of iron; but the affection is temporary, disappearing in a short time, which I have had frequent opportunity of noticing. It is also a fact confirmed by experience, that *arsenic paste* can exert its corrosive effects in the most delicate tooth-structure; and I saw a tooth lately which had been treated with this agent, and had assumed a deep reddish-brown color, showing how exceeding careful it is necessary to be in using this otherwise excellent remedy.

"With regard to the causes of this reddening, they are constitutional and local. The examples of the affection attending cholera and death from suffocation were mentioned in the Transactions of the Society. In general, diseases in which the blood proceeds to decomposition are causes. The local causes are of greater interest to the dentist—viz., mechanical injuries, as from a blow or fall, etc., and inflammation of the soft portions of the tooth, as the pulp and periosteum. The effects of medicinal coloring matter have been alluded to; but, as specially influencing the teeth, little is known to me. The most frequent cause is probably 'inflammation,' and Hr Fricke lays particular stress on its rheumatic origin; but I have not been able to trace one of my cases to this source, and the word 'rheumatic' is one so vague and indefinite that I do not deem it advisable to dwell upon it.

"In conclusion, I will mention a few cases which have fallen under my observation, referring slightly to their peculiarities, and adding a few words as to their treatment.

"When a student I witnessed a case of saturated redness in the tooth of a young man, twenty years of age, caused by a violent blow with the ivory knob of a walking-stick: in this case the change of color was the immediate result of the injury, and never entirely disappeared; at least, I saw the case again several years later, and the tooth was still strikingly stained, though more yellowish. No treatment had been attempted.

"I remember a second case of acute origin, in which, after the repeated application of leeches, the redness gradually but effectually disappeared.

"In the summer of last year, I destroyed the pulp of a central incisor for a lady, about twenty-five years of age, by means of a barbed drill, preparatory to plugging with gold: the hæmorrhage was greater than usual, on which account I deferred the operation for a fortnight, during which time there was no further effusion of blood. Several days after completing the operation, there was a return of hæmorrhage, (Nachblutung,) and in a very short time the tooth turned quite red. That in this case imbibition took place in the dental tissue itself, is proved by the circumstance that the removal of the filling, cleansing the pulp cavity, and keeping the cavity open for a time, had only a slight influence on the coloring. I see the lady occasionally, and the tooth is now, after eight months, almost as red as at first, and I am about to replace it with an artificial substitute at the patient's urgent request. The tooth has been entirely free from pain from the first.

"The following is the most instructive case, and one very vivid in my memory, as it has led to an operation only lately. Two years ago, a lady, about thirty-two years of age, of delicate appearance, with wax-like complexion, and all the signs of chlorosis, consulted me about a tooth, which, in the course of a few weeks, had assumed a darkened color, and ultimately a striking red: this occurred without any pain, and, beyond the above-mentioned malady, there was no other pathological condition, even locally. Doubting the efficacy of treatment, I consoled the patient with the observation, 'that it would right itself.' A few days ago she visited me again—I having, in the long interval, quite forgotten the case—and requested to have another tooth in its place; upon which I excised the crown of the left central incisor, and substituted a pivoted tooth. Of course this was a favorable opportunity for a closer examination of the tooth: the redness proceeded from the centre—*i.e.* radiating from the parietes of the pulp cavity toward the periphery; in the middle it was of a dark-bluish red, externally of a paler hue; the enamel was perfectly free from any tinge, for on making a longitudinal section it did not exhibit the slightest discoloration; on drilling the canal in the root, a dirty, reddish, fetid fluid escaped; there was no trace of caries. The new tooth has answered well up to the present, without the occurrence of any inflammatory reaction.

"A few words more with regard to treatment. Fresh cases of acute transudation, especially when caused by external violence, appear to be accessible by the repeated application of leeches, which treatment should always be resorted to: perhaps drilling into the pulp cavity (trephining) might be productive of beneficial results. When of slow origin and of a chronic nature, I doubt the efficacy of medical aid, for by means of pharmaceutical agents no result is attainable. When the discoloration is prominently conspicuous, the only remedy is artificial reparation. I tried once to bleach a tooth with *chloride of lime*, and was soon convinced as to the inutility of the attempt.

"The following observations on the above subject are extracted from a short paper contributed to the first number of the *Deutsche Vierteljahrsscrift für Zahnheilkunde*, 1861, by Hr Fricke of Lüneburg:—

"When the affection is of acute origin, manifesting itself by sudden and violent pain, the tooth exhibits a heightened tone of color and greater extension of redness; the pain is generally continuous, and the patient is compelled to seek relief in extraction. Let its course be either chronic or acute, the pain experienced is similarly indescribable with that produced by exostosis. Hr Fricke believes the occurrence of this phenomenon predominates in the male sex, and between the ages of twenty and thirty. He attributes the discoloration to impeded circulation attending inflammation, and can discover no structural alteration with the aid of the microscope; yet he has observed a proneness to fracture at the stained portion of the tooth. Placing the teeth in water for twenty-four hours did not influence their color in the least degree, and specimens which he had possessed for ten years remain unaltered. In three years, seventeen cases had occurred in his practice; seven in 1858, three in 1859, and seven in 1860. He thought it not improbable that the appearance of this phenomenon might be endemic, and urges his fellow-practitioners to bestow a careful examination on all teeth extracted, in order to determine the question, particularly as the characteristic stains, which vary in tint, so easily escape detection.

[" It appears that the teeth of the lower animals are subject to this malcondition as well as those of human beings, as evidenced in a skull of *Lutra vulgaris*, in the possession of Hr Fricke.—G. H."]

It is a somewhat remarkable circumstance that dental literature, like certain diseases, occasionally becomes epidemical in its character. Without referring to past instances as evidence of the correctness of this assertion, it is only necessary to direct attention to the number of writers at present engaged upon that all-important, and heretofore much-neglected subject, discoloration of the teeth. There is no theme more worthy of careful *investigation* than this, and there is none, perhaps, in which the cause or causes have been more misunderstood and misrepresented, and the treatment for the eradication of which has, to a majority of patients and operators, afforded less satisfaction. The more light we can obtain, therefore, the better; and every suggestion that is advanced should be tried *practically* before *condemning it theoretically.*

It is gratifying to notice that the increased number of *practical* microscopists is overthrowing the absurd views formerly entertained, that the discoloration of dentine was due to the passage of the red corpuscles into the dentinal tubuli in inflammation of that tissue. Years ago we took decided ground against this position, and maintained that the size of the red corpuscles made their passage into the tubuli a physical impossibility, and that the change of color was due to the breaking up of the corpuscles, whereby the hæmatine becoming mixed with the liquor sanguinis was readily carried into the tubuli and there deposited. Although this view has been objected to by some, we have yet to meet with, or read after a *thorough* microscopist who denys it.

In inflammation of the dental pulp, particularly, teeth are apt to become reddened by rupture of the vessels and corpuscles, and passage of the hæmatine into the tubuli. Under such circumstances an opening should be made into the pulp cavity as soon as possible, so as to admit of the escape of the pent up fluid. This opening may be effected by cutting through a decayed cavity; or if it is a sound tooth, that has sustained a severe shock from a blow or a fall, the cavity may be reached by drilling through sound tooth substance, selecting of course for this purpose the least objectionable localities.

Discoloration of teeth not unfrequently accompanies or follows the application of arsenious acid to sensitive dentine, and of the arsenical paste when the pulp is exposed. The change, however, is not due, as some assert, to the mere fact of using arsenic, but to inflammation of the dental pulp and subsequent disintegration of that tissue induced thereby.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Lecture on Dentition and its Derangements. By A. JACOBI, M.D., Prof. of Infantile Pathology and Therapeutics. "*Anatomy and Physiology of Mucous Membrane in General; Nature of its Secretion; General Pathology of Mucous Membrane; General Etiology; Primary and Secondary Nature of Diseases; External Injuries; Cold; Atmospheric and Epidemic Influences; Constitutional Poisons; Contiguity and Sympathy; Different Forms and Symptoms.*—I have several times alluded to certain qualities and actions of the mucous membranes in general. But you will better understand many of the foregoing remarks, after following me in the investigation of several anatomical and physiological facts, concerning both the structure and function of the mucous membranes. And certainly, they are deserving of every attention that can be bestowed upon them, not only on account of the large surface they cover, but also in consequence of their physiological and pathological importance. As the cutis forms the external integument of the body, so does the mucous membrane form the internal covering of any and all the organs. Thus, we find them all over the respiratory, digestive, uropoietic, and sexual organs, and in all those isolated cavities, like the maxillary and frontal ones, which are connected with the larger ones by narrow ducts; further in the glands, the affections of which are either genuine and primary, or continuations only of a morbid process on a mucous membrane, and their ducts; the conjunctivæ, the external ear, and the galactiferous ducts of the female breast.

"The mucous membrane of an organ or a system is not confined to certain limits. Except on the lips, on the external ear, and other localities where we distinctly perceive the gradual replacement of epidermis and cutis by mucous membrane, we are nowhere enabled to determine where the mucous membrane of this organ or system finds its end, and that of the other commences. Thus, there is no boundary between the mucous membranes of the digestive and the respiratory organs, nor any between that of the stomach and the duodenum. Their internal structure is alike, and therefore I deem it more proper henceforth to speak rather of mucous membrane, than of mucous membranes. Its uniform layer consists of dense connective tissue, intermixed with blood-vessels and elastic fibres, in its deeper laminæ with muscular fibres also, and is covered with several layers of epithelial scales, which are readily thrown off and renewed; they may, however, be accumulated in yellowish, brownish, or black masses. Beside the blood-vessels there are lymphatic vessels, and the smallest ramifications of nerves, which are particularly found in the papillary prominences. They are either the last ends of a cerebral or spinal, or of the sympathetic nerve; the peculiar actions of these several nerves determining the functions of the locality in which they spread. The mucous membrane, influenced by the cerebro-spinal system, is more sensitive, as a general rule, than such localities in which the power of the sympathetic prevails. Thus, pain depends on the seat of the affection just as well as on its acuteness; the degrees of temperature are discerned by the pharynx, but not by the stomach or intestine; urine produces no pain whatever on the mucous membrane of the urinary bladder and urethra, but very much so on that of the conjunctivæ; and often irritations meeting a mucous membrane effect no pain nor other local disturbances, but sympathetic sensations, like coughing or sneezing.

"The functions of the mucous membrane are both various and important. It takes a prominent part in assimilation and sanguification, and therefore suffers in all general, and all those local diseases that in any way influence the general condition of the organism. They are frequently first affected in a large number of diseases, many of which are primary; for the immense extension of mucous membrane, increased by indentations, villi, glands and glandular ducts, and papillæ, is such that morbid processes may easily take place in one part or another. The influence of the diseased mucous membrane is, moreover, as great as its affections are frequent; the vital importance of the membrane itself, the legions of nerve ramifications in its tissue, and the contiguity and rapidly developed consecutive affections of the mucous membrane contributing to the same result. The occurrence of œdema of the glottis in catarrh of the pharynx or larynx, or of collateral œdema of the vocal cords in diphtheritic inflammation of the larynx, are distinct and much dreaded proofs of this fact.

"In its normal condition, the mucous membrane exhibits a peculiar tough, whitish or clear, more or less transparent, alkaline secretion, called mucus. It contains mostly epithelial scales, more or less transformed, of every variety; pavement, cylindrical, and vibrating, the latter without its cilia; further, round granulated cells with one or more nuclei, and a clear transparent liquid. Epithelium, mucus, and pus are found combined in many instances of secretion on the mucous membrane, the three various forms being, in this locality, but three different stages of the transforming epithelium. Under favorable circumstances, the mucous membrane forms puriform elements anywhere, but there is some difference in the process. The purulent mucus of the intestine contains very seldom puriform elements, that is, pus cells, except in cases of genuine ulceration; the same result is found on examinations of the purulent mucus of the uterus and tubes. But no ulceration is required in the mucous membrane of the bladder or urethra to count immense numbers of pus cells in the puriform secretion of chronic vesicular catarrh and gonorrhœa. This difference depends on anatomical reasons. The intestine, uterus, and Fallopian tubes have cylindrical epithelium only, bladder and urethra, however, pavement epithelium. The mucous membrane will develop the more pus cells without the presence of real ulceration in proportion to the amount of pavement epithelium by which it is covered. Purulent though the secretion of other parts of the mucous membrane will look, it contains frequently nothing but cylindrical epithelium. The angular shape of the pavement epithelium enables it to form a cohering covering, which is not thrown off so easily as the round pus or mucous cells; thus the lower layers have full time to develop into mucous cells; which result being obtained, the whole mass is thrown off by either the pressure of the subjacent new layers, or the influence of a thin and less cohesive transudation from the blood-vessels, which, in its turn, forms another important element of the secretion. Whether it has a more important part than to be one of its elements, whether, for instance, from its substance cells may be developed, or whether the cells are under all circumstances but the later stages in the development of epithelial scales, is still an open question.

This is certain, that what is called mucus is by no means always the same liquid, no more so than that the secretion of the external skin is alike on every locality of its surface. Its reaction is acid in the stomach, alkaline in the mouth and intestinal canal; a mucous substance is secreted from the parenchymatous substance of some organs, without the presence of cells; there are pathological liquids, as colloid, very similar to mucus; there is the substance called after the name of Wharton, in the umbilical cord of the fœtus and newly born, the cellular development of which cannot be traced; and nevertheless this 'gelatinous connective tissue' is transformed into mucus. Thus, from an anatomical point of view, the secretion of the mucous membrane is not a uniform substance; neither is it uniform as to chemical composition. I have stated that its reaction differs according to localities. It frequently contains albumen, some little fatty substance, extractive matters, and some mineral elements, as chlorides of alkalines and phosphates of earths. These mineral elements belong to the mucine, which is a nitrogenous, albuminous substance, swelling in water, but not dissolved by it, and to which the mucus owes its tough nature. Its chemical reaction differs according to its percentage of minerals, combination with other poisonous substances, or its own peculiar modifications. This difference is easily explained by the fact, that it is not preformed in the blood and thrown on the surface, but is a production of the mucous membrane itself. Thus its constitution depends on the amount of follicles, epithelial scales, papillæ, and on the character of the epithelium; no matter whether it is formed directly from the epithelium undergoing its final changes, or from transudation through the walls of the capillary vessels.

"In regard to the diseases of the mucous membrane, I have already stated both their frequency of occurrence and their proclivities for complication. Their tendency to sickness is, however, not uniform; individuality and age belonging to those influences which are most apt to modify the alterations taking place in their tissue or secretion. Affections of the mucous membrane are very rare in fœtal life, because of the absence of both mechanical injuries and functional disorders. In infantile age the mucous membrane reaches its greatest importance, new influences acting upon it and calling into life new functions, especially the normal state of injection, which is very considerable indeed. A very common alteration taking place in the mucous membrane is mollification; plastic exudation, hæmorrhage, suppuration, and ulceration being very rare in the first year of life. After this time exudative processes are more numerous, especially fibrinous exudations are not unfrequent. This predisposition of early age to contract diseases of the mucous membrane, is afterward decreasing, is not very common in advanced age, until in senile age it is rather increasing.

"A number of diseases of the mucous membrane in early age are of a primary nature, and many of them result from direct local injuries. It is a singular fact, however, that thorough and deep local injuries, cuts and wounds of any kind of the mucous membrane, dangerous though they look, are attended with very little danger in the majority of cases; they will generally heal readily and lose nothing of their merely local character. Thus foreign bodies entering the substance, combustion destroying the structure of the mucous membrane, although sometimes among the causes of a disease, will not so frequently give rise to a severe affection, as a less serious injury often repeated. Animal or vegetable parasites, and indigestible food, will therefore, as their influence extends over a longer period, although their sudden insult is often but inconsiderable, be among the most frequent diseases of the mucous membrane of the digestive organs. Another very important and frequent cause of diseases of the mucous membrane is refrigeration. We are entitled to state this as a fact; although we do not know whether cold acts by the suppression of cutaneous secretion alone, or by some influence on the peripheric cutaneous nerves and reflex action alone; or by both. It is, however, a fact that especially the mucous membrane of both the respiratory and digestive organs is very subject to the influence of cold, together with the other causes of disease depending on the general condition of the atmosphere, and the changes and general influences of season, of epidemics and endemics.

"These latter are of great importance in the etiology of the affections of the mucous membrane in early age; for we know that not only malarious influences and animal effluvia will readily act on the impressible infantile organism, but the constitutional and contagious poisons are mostly observed to produce their peculiar forms of disease in infantile age. Thus children are the majority of patients suffering from eruptive fevers; scarlatina, measles, and diphtheria mostly attacking the infantile organism. And here it is important to state that a peculiar part of the mucous membrane has always a tendency to be affected by a peculiar constitutional poison, both in early and advanced age. Thus diphtheria, scarlatina, syphilis, and mercurialism show a predilection for the mucous membrane of the mouth and pharynx, typhus for the ileum, dysentery for the colon, measles and iodism for conjunctivæ and nose. All such affections, although common to every age, are mostly found in the infantile period, the modes of propagation and transmission being eminently distinct at this period of life.

"I have frequently alluded to many cases of secondary affections of the mucous membrane; they are the usual results of either local propagation in the continuity of tissue, or of sympathetic spreading. We know from general pathology that there is a direct connection between cutis and mucous membrane, scalp and nose, mamma and uterus, urethra and testicles, and stomach and brain; we need not be astonished then, that there is a contemporaneous affection sometimes of the mucous membrane of the nose and the lungs, the larynx and trachea being free from disease; or of the stomach and colon, the small intestines being not at all affected. And the spreading of affections of the mucous membrane on continuous tissue is so very general, that lobular pneumonia, for instance, is in all cases recognized as the termination of a catarrh of the bronchi; and a protracted catarrh of the colon with ulceration of the follicles is known to be a usual consequence of catarrh of the small intestines. Nor is the topical propagation of affections of the cutis over the adjoining mucous membrane an exception, but the rule. The transmission of diphtheritic and other processes of the external integuments of the lips, anus, and pudenda majora, on the mouth, rectum, and vagina, are frequently observed.

"Thus it appears that nothing is more natural than a universal or widespreading hyperæmia, changes in both quantity and quality of secretions, rupture of blood-vessels, and even neoplasms. The alterations observed in the secretions are frequently more important in relation to post-mortem epicrises, than the anatomical change of the tissue itself; for you have learned already, from a previous lecture, that not unfrequently no anatomical trace is detected in patients who have died from, or with, hyperæmia of the brain, pharynx, intestines, or cutis. The abnormal secretions are therefore as important elements in regard to the results of post-mortem examination, as they again are ready causes of renewed attacks, from the local irritation depending on their presence on the membrane. The prognosis, therefore, depends greatly on their nature and amount, and frequently as much on them as on the structure of the membrane, its epithelium, follicles, or papillæ. To a great extent they also influence the symptoms, among which functional disorders and anomalous secretions are always prominent. Pain is sometimes observed, but it is frequently indistinct and obscure. Of more importance than the latter, however, are some indirect symptoms, of which reflected motions, and even muscular paralysis, are frequently met with. Thus, sneezing, coughing, vomiting, and tenesmus are brought on. Disorders in neighboring or distant parts are effected by the suppression of secretion and injection of the tissues; topical spreading on the subjacent submucous tissue, as in œdema of the glottis, and retro-pharyngeal abscess; and participation of the whole system.

"After these general remarks you are enabled to trace a direct connection between even the slightest causes and severe affections. I have taken particular pains, in former lectures, to present for your inspection a number of affections which, severe though they be, owe their origin frequently to a comparatively insignificant cause. The greatest stress has been laid by me, further, on the large number of slight or unimportant causes giving rise to affections of the mucous membrane. That in some cases an abnormal process of dentition will prove a source of evil, I do not deny; but from many previous remarks, and from comparison with other causes of diseases, you have arrived at the conclusion that the vast majority of diseases of the mucous membrane allow of another explanation than the blind assumption of the culpability of a physiological process. The great progress of pathological anatomy and differential diagnosis ought not to be lost on us. The period, where the diseases of small children consisted in dentition, of advanced ones in worms and scrofula, of adults in rheumatism, scrofula, and syphilis, is past. With sound principles in pathology, and a correct knowledge of pathological anatomy and differential diagnosis, all the different and numerous affections of the mucous membrane: simple injection, with or without extravasation; acute hyperæmia, with increase and alteration of the secretion, and follicular swellings; acute serous or bloody exudations, with more or less severe symptoms; pseudo-membranous deposits of epidemic, syphilitic, or mercurial character; purulent discharges; ichorous decomposition; chronic alteration of both vascularization and secretion; hæmorrhage; œdema; hypertrophy and whatever changes we have learned to take place in the mucous membrane of all the organs that have been submitted to your attention in previous lectures—will no longer present to you the difficulties of bygone times, nor urge upon you the necessity of resorting to an obscure, generally erroneous and improbable, and almost always unproven explanation."—(*Amer. Med. Times.*)

On the Degeneration of Divided Nerves and the Various Degrees of Excitability Exhibited by the Nervous System. By M. CLAUDE BERNARD.—"The modifications which take place in the different orders of nerves, after they have been divided, have often been alluded to in this course; and we promised to give you a practical illustration of the results to which the researches of various authors have led. We killed this morning the dog which was brought before you a few days ago, and which, in the earlier part of this course, had been employed for the demonstration of recurrent sensibility in motor nerves. In this animal, which had perfectly recovered, the anterior and posterior roots of two nervous pairs had been divided. The autopsy being made immediately after death, we found that the anterior roots still retained their usual size and appearance; while the posterior ones were shriveled up, were become opaque and of a grayish color, and had completely lost the transparent whiteness of sound nerves. On examining these nervous trunks under the microscope, we ascertained that the central extremity of the anterior roots was composed of ordinary nervous tubes, containing, as usual, a cylinder-axis (or primitive band) and an oily transparent fluid; while the posterior roots were totally degenerated, and no longer exhibited the slightest trace of a distinct organization; and this modification could be traced back to the very centre of the spinal cord, from which they spring. We even believe that this disorganization of the sensitive nerves, when divided, might lead anatomists to settle the controversy on the decussation of fibres in the spinal cord; for on tracing back the degenerate nervous tubes to their primitive extremity, it might be ascertained whether they terminate on that side of the spinal axis from which they apparently emerge, or pass over to the opposite side.

"The peripheral extremities of the divided roots being lost, as it were, in an indurated mass of cellular tissue, have not been examined: it would, in fact, have been exceedingly difficult to trace them out; but the results of our personal investigations, as far as the central portion of these nerves is concerned, fully confirm the opinions of the physiologists who have already studied the question; the central portion of sensitive nerves, and the peripheral extremity of motor ones, are atrophied in consequence of the operation. We have, at the same time, verified the observations of certain authors upon the human subject. M. Turck, of Vienna, in making the autopsy of certain hemiplegic patients, ascertained that whenever a nerve degenerates, the disorganization ascends to its origin, within the nervous centres —a remark fully corroborated by our own observations.

"Let us now resume our studies upon the influence exerted by the nervous system upon the chief functions of life. All the organs of the body, as you are well aware, are called from a state of rest to an active condition, when a stimulus is applied to the nerves; the reverse is the case when they are divided. But although the nature of the phenomena created in this manner is always identical, their intensity is far from being always the same; it depends upon the degree of nervous excitability possessed by the subject in each particular case. Such, no doubt, is the principal cause of the physiological differences which exist between the various species of animals, or between animals belonging to the same tribe; the same individual when compared to himself offers important variations in this respect. Have we not seen that, during abstinence, the pneumogastric nerves are almost totally insensible, while after a meal this sensitiveness grows intense? The differences which exist between various kinds of animals are hardly more extensive than those which the same animal exhibits during abstinence and digestion. It must, therefore, be understood that the properties of any given tissue remain invariably the same throughout the scale of being, and only disappear in those tribes in which the tissue itself ceases to exist."—(*Med. Times and Gaz.*)

Phosphor-Necrosis.—In his sketch of the proceedings of the Medical Congress at Zurich, Switzerland, the correspondent of the *Med. Times and Gaz.* gives the following resumé of some observations upon this subject: "Professor Billroth introduced the members of the Association to the wards of the surgical clinic in our beautifully situated and admirably-kept hospital, where he showed a large number of patients on whom operations had been performed. He first drew attention to several cases of phosphorus necrosis, which disease unfortunately is increasing here in proportion to the development of this branch of modern industry, and of which during the last year no less than eleven cases have come under treatment, of which six are still in the hospital; while in former years generally only four or five of them occurred annually. In seven of the eleven cases just mentioned, more or less extensive resections had to be performed, of which two ended fatally. In one of them death took place in consequence of tuberculosis of the lungs, after the total resection of the jaw was nearly healed; in the other by erysipelas traumaticum, which at a certain time of the year occurred somewhat frequently in the hospital. Of the eleven cases, nine were necrosis of the lower, and two of the upper jaw. A considerable disfigurement of the face is the inevitable consequence of the long suppuration and new formation of bone tissue; and it also remains after operations, which have been most successful in other respects. The opinion advanced about twenty years ago by Professor Jüngken, of Berlin, that phosphorus necrosis was not the consequence of the specific effects of phosphorus vapors, but had its origin in the cachectic condition of the men employed in manufacturing lucifer matches, who were exposed to rheumatic influences, must be totally disregarded. The reason why phosphorus should act with preference upon the periosteum of the jaws, is, up to the present time, just as inexplicable as that mercury should have a special effect upon the mucous membrane of the mouth, calomel upon the liver, iodine upon the glands, strychnia upon the spinal cord, etc.; but the fact cannot be denied. In obstinate toothache, caries of the teeth, even in periostitis and caries of the jaws, the symptoms and results are quite different from those observed in phosphorus necrosis. This latter comes on only in consequence of a long-continued inhalation of phosphorous vapors, either as gas or as phosphorous acid. It is not unfrequently observed in persons with originally remarkably handsome and healthy teeth; in some it comes on after they have resided or been employed in the factories for a year only; in others, after five, ten, or even more years. The first symptoms of the disease are the falling out of single teeth, toothache, and swelling of the jaws, which does not decrease, but continually augments. Fistulæ of the teeth are then formed; abscesses, which break either into the mouth or outward; while, at the same time, the swelling of one-half or one-third of the lower jaw becomes more considerable and harder. Besides, a cachectic condition of the system generally is observed in an early stage of the disease. This is shown by pallor of the complexion, weakness, loss of appetite, acid eructations, etc. The exhaled air and the cavity of the mouth have a strong smell of phosphorous acid; and a patient who has been under the care of Professor Billroth, while at Berlin, assured him that he had often seen phosphorous, luminous appearances proceed from his mouth. This is observed even after the patients have discontinued living or working in the factories for some time. The suppuration, the formation of fistulæ, the development of new layers of bone tissue, almost always continues for months or even years; the deglutition of pus and the deficient mastication of the food render the condition of the patients worse and worse. Professor Billroth has in several instances tried an abortive treatment of the periostitis, before necrosis of the jaws had set in; but up to the present time his efforts in this direction have been unsuccessful. Deep incisions, even down to the bone, made at an early period of the distemper, in order to prevent the accumulation of pus, and to stop, if possible, by the inflammation and granulation consequent upon such operative proceedings, the process of destruction, have hitherto never led to the desired result. In cases when the patients come to the hospital at an early period, Professor Billroth is therefore now trying the effect of a thorough mercurial and iodine treatment of the disease.

"The course of the disease is usually a most melancholy one. Every few months a new attack of periostitis sets in, the demarkation proceeds further, parts which were healthy before are deadened, and even newly-formed layers of bone tissue are again destroyed. The cure, or rather the stoppage of the morbid process, if the patient do not die before by consumption, follows only after years of suffering, in consequence of entire destruction and elimination of one-third, one-half, or even three-quarters of the lower jaw. The disease is much less frequent in the upper jaw; but if this be attacked, the destruction is generally even more extensive. A partial or total resection of the mandibula shortens, at least, the course of the disease, which would otherwise last for years; and although extensive disfigurements remain after such an operation, it ought not to be rejected on that account, as it is the only means we have of saving the life of the patient. In operating, Professor Billroth penetrates immediately, with one incision, which he makes parallel to the necrotic part, through the skin down to the bone; he then scrapes off the periosteum with its bony layers upward and downward, by means of a raspatorium, and saws smaller or larger pieces of bone out of the jaw; or he nips those pieces off by means of bone-pincers. In a few cases it appeared advisable to disarticulate at once one or both coronoid and condyloid processes of the lower jaw, which was very easily done, as the joint had become very loose in consequence of the long suppuration. Of the six cases shown by the professor, two were healed, and among them was one of total resection of the jaw in a woman of thirty-five years. This case was in so far remarkable, as two apparently healthy teeth had remained in the periosteum, which had become partly ossified, and in the gums, which had remained healthy; and these have now been used for three months. Mastication is not impaired, and the woman has a much healthier appearance. The second case, in which the resection of one-half of the jaw was performed, is also well healed; but the mouth is, of course, crooked. Two cases, in which a partial resection has been made, are progressing favorably; in another case the treatment with mercury and iodine has been commenced. Professor Billroth requested the doctors present at his demonstrations, and especially the Medical Officers of Health, to do all in their power to prevent the further occurrence of this disease, by ordering better sanitary measures to be taken in the factories than those in use at present."

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On Mercury and its Relations to Dental Decay.—In the course of some remarks on the neglect of therapeutics and the distrust of medicinal agents, the editor of the *Med. Times and Gaz.* makes the following observations upon this subject, which, though presenting nothing very novel, are yet of much practical interest. "The medicine usually selected for denunciation on the plea of its 'injuring the constitution' is calomel or mercury in any form. It is pretended that mercury lingers long in the animal body, and produces various deleterious effects. Charlatans who set up 'galvanic baths' pretend that they can extract through the skin quicksilver which has been deposited in the bones; and uneducated dentists always ascribe the decay of their patient's teeth to the taking of calomel, although sometimes, indeed, the mischief is ascribed to steel or mineral acids.

"We may admit, for argument's sake, that calomel may in times past have been administered profusely, needlessly, and injuriously, although in most cases the excessive doses were either taken without medical advice, or at the instigation of the patient. But it is easy to show how void of truth is the assertion that decay of teeth has been caused in this way.

"Mercury administered in large doses to any person, and in very small doses to some persons, produces various amounts of disorder of the mucous membrane of the mouth, from the slightest swelling and sponginess up to absolute sphacelus. If the affection be so severe as to destroy the gums, and especially if the patient be advanced in life, some of the teeth may drop out, just as they do in old age, from atrophy of the parts by which they are supported *in situ*. But such teeth may be absolutely sound in themselves; and if there be no loss of substance of the gums, the patient does not of necessity experince decay nor loss of a single tooth.

"On the other hand, decay of the teeth, owing to original want of vital force and sound development, is constantly seen in young persons who have never taken a grain of mercury. The rachitic, pallid children of courts and alleys may be seen with the milk incisors decayed almost as soon as they are cut; stunted and rickety children (especially idiots) have decayed teeth as a rule, and we have instances under our own observation in which early decay of the teeth has occurred in patients who, we are absolutely certain, have taken no calomel

"Again, it is a curious fact, that whenever the nutrition of the body is thoroughly disturbed for any length of time, some of the more passive tissues or structures are apt to suffer. Delicate women who suckle may lose their hair; many persons have imperfect development, or even shedding of the nails, from almost any indisposition; and the loss of teeth during pregnancy is so common, that some women believe they lose a tooth with every child.

"But scrofulous, ill-developed, rachitic children, whose teeth are habitually predisposed to decay, are particularly liable, also, to fits of cachexia, or feverishness, or gastric derangement in which the nutrition of the teeth is doubly exposed to interruption. It is matter of experience that nothing cuts short these feverish attacks of children so quickly as calomel in small doses. But then to ascribe to the calomel that 'ruin of the teeth,' which happens in the same kind of patients, even when they take no calomel, is absurd; and such an accusation is singularly inconsistent in the mouths of the quasi-skeptical naturalistic school, who are wont to question the utility of drugs in disease, on the ground that it is impossible to say that the disease might not have got well of itself without the drugs.

"In like manner, persons who are out of health are liable to suffer decay of some one or more particular teeth. It is probable that if they seek medical aid they may take steel or mineral acids to give them power of eating and digesting more food. When they apply to the dentist (unless he has had a medical education) the decay of the teeth is surely ascribed to the steel and acids."

"*On Conservative Surgery.* By J. J. CREGEEN, M.D.—In continuation of the series of interesting cases of conservative surgery so well initiated by Dr. Nichols, I beg to forward the following, which occurred in my practice:—

"W. E—— applied to me, one evening, with a wound on the palmar aspect of the left thumb, having, in cutting some bread, cut a large slice of the flesh completely off. Having the piece doubled up in his hand, I very carefully adapted it to the wound, as near as possible in the original position, applied a bit of dried lint, and bound it up. He applied again in two or three days' time, and judge of my surprise to find that all had united by the first intention, and that the cure was complete!

"M. C——, in having a lower molar tooth extracted, so suddenly withdrew her head and caught hold of the key as to draw out a sound tooth with the decayed one. The former was immediately replaced, and perfectly united in a few days, never occasioning any trouble afterward.

"J. E—— would have an apparently sound tooth drawn for severe toothache, which I accordingly did, and replaced it as in the foregoing case, and with a like result.

"In another case, I drew a large molar, (which had only a slight mark of decay,) so as to break all attachments, but not to remove it entirely from the socket, and then pushed it gently down again into its original position. The toothache was removed and the tooth saved, and never occasioned any trouble afterward."—(*Lancet.*)

Artificial Teeth in Pharynx.—MR. FREDERICK C. SKEY relates the following interesting instance of this kind in the *Lancet*: "In June last I was summoned to a curious accident. A young woman was admitted into St. Bartholomew's Hospital, wearing a set of artificial teeth, consisting, if I recollect right, (for I quote from memory,) of four, connected by a plate of metal, from each extremity of which descended hooked processes to fix it on the gum. The plate became detached, and she swallowed it, and it fixed itself across the pharynx about an inch from its termination in the œsophagus. The accident occurred in South Wales, and, having made one unsuccessful attempt to remove the foreign body, the medical attendant brought her up to London. The accident had happened twenty hours when I saw her. The woman was in much distress, not from obstruction in the pharynx merely, but also from pressure on the larynx. The finger, passed with a considerable effort, reached the object, but only touched it with difficulty. From Ferguson's ample collection of forceps, of every form, size, and variety, I succeeded in selecting a pair. After two or three futile efforts, having fairly grasped the foreign body, I extracted it, not without the application of great force, so tightly was it held by the pharyngeal muscles. I do not pretend to any skill in the accomplishment of this not very difficult task, which owes its success to the advantage afforded by a hospital in selecting, out of a large number, the appropriate instrument for the purpose required. I kept the woman in the hospital till the following day, during which interval she exhibited no bad symptoms, beyond slight bleeding and soreness in taking food."

"*New Composite Metal for Dies, Matrices, and Types.*—On page 30 of our present volume, we stated, in answer to a correspondent, that we had never seen dies made of any other metal than steel for stamping metal plates, and that no other metal but steel will stand the severe pressure to which such dies are subjected. We have received a letter from Messrs. Smith & Stein, of Philadelphia, in which it is stated that they have lately engaged in the manufacture of dies, moulds, embossing plates and type (and all similar articles universally made of steel) of a new composition of metal, invented by J. G. Smith, and patented Sept. 20, 1859. This composition, while it is said to be as hard as steel in its natural state, becomes quite soft under a certain mode of treatment, when a perfect impression can be taken by it of 'the most delicate engraving.' The composition dies, we are informed, have been purchased for the use of the Mint in Philadelphia, by James Ross Snowden, Esq., Director.

"The patent of Mr. J. G. Smith, as originally granted on the above date, is for 'the discovery of rendering a composition or alloy of copper and tin pliable, and in such a state as to admit of an easy impression of any figure or design, on or in metal, whether engraved or produced by electro-plating, such as the copy of any figure or design,' and that it thus yields a perfect matrix. The patent was reissued April 10, 1860, with three claims, in one of which it is stated that the alloy of copper and tin used becomes soft and almost wax-like at a red heat, in which condition it is used for the production of the articles we have specified. If such dies are in all respects equal to expensive steel dies, this is certainly a most valuable discovery. We scarcely expected that dies rivaling those made of steel could have been made from a plastic metal."—(*Scientific American.*)

Kerosolene—The following interesting observations upon the anæsthetic properties of this agent are reported in the proceedings of the Middlesex East (Mass.) District Med. Soc., published in the *Boston Med. and Surg. Jour.* "Dr. S. A. TOOTHAKER, of Wilmington, said that he had administered the article, which was distributed at the last meeting, once, with the most satisfactory results. It acted quickly; there was no suffocative difficulty, no nausea, and no convulsions. The patient was a young man who had just recovered from tonsillitis, and the operation was for the extraction of a tooth. Upon inhalation, he began to laugh, and opened his mouth in such a manner as to afford an excellent opportunity to apply the forceps. The tooth came very hard. The man made some noise, and in a minute or two recovered his sensibilities. He knew nothing of the extraction, except by the blood in his mouth. He was very lively and 'chipper,' and expressed himself as having had a pleasant dream. Quantity administered, one and a half fluid ounces. Whole time occupied, five to six minutes.

"Dr. H. P. Wakefield, of Reading, gave it twice to one patient with success. He was a shoemaker, who had hurt two of his fingers by working on 'army-shoes.' At the seats of injury, there was pus. Kerosolene was administered upon a cloth. He came under its influence very readily, and 'lost himself.' He was inclined to laugh, but he would not keep still, and as the Doctor had no assistant, the operation of opening the abscesses was deferred. He soon recovered, and was dismissed to return again with a friend. He did so, and the kerosolene was given as before. He readily came under it, but not to insensibility. The assistant held the wrist, and both fingers were opened to the bone. He seemed just to feel it. On coming to himself, he said he did not suffer anything. He passed from the influence of the kerosolene as readily as he came under it. Quantity employed in both trials, three fluid ounces. No nausea, no suffocative difficulty, nor unpleasant effect. Dr. Wakefield thinks the kerosolene more powerful than chloroform.

"Dr. R. L. Hodgdon, of West Cambridge, employed the kerosolene received at the last meeting, in a case of Barton's fracture of the radius. The patient went quickly off to sleep. There was no change in the pulse, and sensibility was recovered sooner than with ether, and the patient came under it more easily. Quantity administered, two fluid ounces. He also gave it to a woman for the extraction of four teeth, with success. In fact, the Doctor expressed the highest satisfaction with the results of his trials.

"Dr. A. Chapin stated that he had taken the kerosolene himself, with the effect of sudden anæsthesia. He also remarked that he had given it to a lapdog. A sponge and the dog's head were placed in a coat-sleeve, and the kerosolene poured upon the sponge. The animal came under it kindly, easily, and quickly. Compared with the action of ether and chloroform upon this class of animals, the Doctor stated that kerosolene had, in this case, marked advantage, in the ease with which it was taken, and in the speediness of its action. There was no suffocation, no convulsions. The dog never 'came to,' as it was killed by a hatchet.

"Dr. E. Cutter stated that he had given kerosolene successfully to a frog, for microscopical purposes. It produced a stasis of the blood in the capillaries of the web of the foot; perhaps no more than has occurred with other anæsthetics.

"Some discussion arose upon the proper pronunciation of the word, some calling it kè-ro-so-lene, and others ke-ròs-o-lene. Upon motion, Dr. Chapin was appointed to settle the orthoepy of the word and to report at the next meeting of the Society, when kerosólene would again be the subject of report and discussion."

Irregular and Premature Decay of the Body.—In one of his able lectures on the Diseases of Children, (*Med. Times and Gaz.*,) Dr. Wm. Jenner makes the following remarks upon this subject: "It is, in reference to the subjects we are reviewing, of interest to note the fact that it is common for special parts to experience the decay proper to age, not only before the period of life at which such decay is the natural course of events, but also long before other parts of the body decay. Thus, one man is old as regards his scalp—his hair is gray, or his hair-follicles have decayed and wasted so as no longer to perform any function, and the man is bald; in another it is the alveoli which waste before their time; in a third the heart and arteries; in a fourth the nervous system, etc.

"This tendency of particular parts to grow old before due time is sometimes hereditary. Early baldness, early falling of the teeth, and an early aged look, we all know, occur in many members of the same family at about the same period of life. So, also, we see member after member of the same family cut off about the same age by apoplexy, by heart disease, by asthmatic complaints as they are called. These diseases being the result, in fact, of degenerations occurring at or about the same period of life—the arteries, or the heart, or the lungs having been so constructed originally, as to begin to decay after so many years of ordinary wear—though care may retard, abuse hasten the decay, and so anticipate or delay the term natural to the individual. Men are old, then, physiologically considered, not when they have lived so many years, but when the structures essential to life have degenerated to a degree almost incompatible with the continuance of life."

Histology of Nerve Tissue. (Extract from Lecture on the Structure and Growth of Tissues, by DR. LIONEL S. BEALE, *Dublin Medical Press.*)—"Now it is in the terminal distribution of the nerve fibres that the structure of the elementary part is to be made out. The investigation is attended with great difficulty, in consequence of the extreme minuteness of the parts to be examined, and the great nicety required in preparing them for examination. The nerve fibres near their termination become diffluent within a few hours after death. Observers are not agreed as to the way in which the final distribution of nerve fibres to the tissues takes place. Some imagine that they end in points or in club-shaped extremities, and others believe that they terminate in loops. By some it is supposed that both these methods of termination may occur. In investigating this point some time ago, I was fortunate enough to make some very successful preparations of muscular tissue which disclosed to me a method of distribution not previously observed. I found that every elementary fibre of voluntary muscle received a vast number of nerve fibres which were spread out, as it were, so as to form a kind of net-work on its surface. These fibres contained numerous oval masses of germinal matter situated at short distances from each other along the course of the fibre. The distance of the masses of germinal matter from each other varies in proportion to the activity of the changes going on in the part. In an early stage of the growth of the fibre the masses of germinal matter are very close together, but as the growth of the fibre proceeds, the distance between the oval masses is increased. The germinal matter probably forms new tissue at either of its extremities, so that as the quantity of formed material is increased, the masses of germinal matter are farther and farther removed from each other. We see, then, that an elementary part of nerve fibre may be represented as an oval portion of germinal matter with an exceedingly delicate fibre projecting from either side of it."

"*Irritation of Sensitive Nerve-fibres and Cells.*—It is very probable that most of the conductors of sensitive impressions, in their passage through the base of the brain, are *inexcitable* in their normal condition. When an inflammation takes place in that part of the brain, the same effect may be observed which is produced in cases of inflammation of the gray matter of the spinal cord: the conductors of sensitive impressions become irritated, and give rise to sensations of formication, of pricking, (as by pins and needles,) of heat or cold, etc. These sensations are referred to the periphery—*i.e.*, in the paralyzed limbs, and especially in the hand and foot. The trigeminal nerve, like other cutaneous nerves, but not so frequently, gives rise to referred sensations, (in the face of course, but also sometimes in the anterior part of the tongue.) I do not think that the other sensitive cranial nerves (the glosso-pharyngeal, the vagus, and the sensitive fibres which probably exist in the spinal accessory) ever give rise to any of the above-mentioned referred sensations. Not much, therefore, can be obtained for the diagnosis of the seat of a lesion in the base of the brain from the referred sensations that may be felt by the patient. All that can be of service to find out this seat is, that the existence of referred sensations in the face may help in proving that the lesion is in the part of the pons Varolii that gives origin to the trifacial nerve."—(*Extract from Lecture, by C. E. Brown-Séquard, Lancet.*)

On Platinum. By Henry M. Noad.—"A discourse on the recent investigations of Deville and Debray was delivered to the members of the Royal Institution, on Friday, February 22d, by Mr. Faraday. Platinum almost invariably occurs accompanied by five other remarkable metals. The whole six forming two groups of three each; each group having an equivalent number very different from that of the other group, and also a very different specific gravity, as appears in the following table:—

Group I. Equiv. number 95·5.			Group II. Equiv. number 53.		
1. Osmium	Sp. gr.	21·4	2. Ruthenium	Sp. gr.	11·3
3. Iridium	"	21·15	4. Rhodium	"	12·1
5. Platinum	"	21·15	6. Palladium	"	11·8

"The three in the first group have the same equivalent number, and nearly the same specific gravity; but osmium takes the place of platinum as the heaviest of bodies. The equivalent number of the second group is alike for all, but it is little more than half that of the former group. The specific gravity of the group also is little more than half that of the former group. The platinum has usually been extracted from these ores, by the action of aqua regia, from the solution in which the platinum is precipitated by chloride of ammonium, and the double salt thus obtained, decomposed by heat, which yields the platinum in a spongy form, and this when pressed, heated, and hammered, furnishes massive platinum. Deville employs an entirely different method: he mixes the ore with its own weight of galena, and half its weight of metallic lead, and then heats the mixture; in this way he obtains a platiniferous lead, from which as much as possible of the lead is expelled in the form of litharge, by heating it while exposed to the air. The alloy of lead and platinum now contains not more than ten, or even five per cent. of lead, and requires a very high temperature to fuse it. It is fused in furnaces constructed of chalk-lime, heated by the insertion of oxy-gas blow-pipes. The heat first melts the alloy, and being combined with oxygen in a little excess, the remaining lead is rapidly oxidized and dissipated in fumes, and then being raised and continued, any gold, copper, osmium, or other metals, except iridium or rhodium, are also converted into vapor and driven off. The platinum remaining is at last heated to a still higher degree, and is either cast into flat cakes or granulated, and this has been done with quantities weighing as much as 40 lbs.; the iridium and rhodium still remaining with the platinum, increases its hardness and renders it less liable to chemical action."—(*Chemist and Druggist.*)

MISCELLANY.

Mr. J. Nichols relates, in the *Lancet*, an interesting instance of complete separation of the nose from the face, with a transverse division of the upper lip throughout its whole extent, so as to allow it to hang down over the mouth, both of which readily reunited on being replaced, and kept in their appropriate positions.

The Paris correspondent of the *Lancet* says: "At the last meeting of the Academy of Sciences a communication was received from Dr. Sédillot on certain points connected with the bone-making function of the periosteum. This practitioner proves that the fibrous envelope of the osseous tissues loses its power of regeneration when attacked by suppurative inflammation, and contends, therefore, that the new operation of resection, which consists in a complete enucleation of a bone from its periosteum, may be, oftentimes, liable to fail; he consequently suggests that, *when feasible*, a layer of the osseous tissue be left in contact with the external fibrous sheathing, as a means of obviating subsequent destructive inflammatory action."

The same writer, in noticing (*Ibid.*) the observations of M. Beau on the influence of lead in phthisis, states, that in relation to the gingival margin produced by this metal, the author believes "the blue line is only seen when there is some superficial erosion or ulceration of the margins of the gum."

In an abstract of an article on the therapeutic employment of cajeput oil, from the *Presse Med. Belge*, (*Med. Times and Gaz.*,) it is reported that M. Delvaux "has found it of great use in advanced and painful dental caries. A drop or two is inserted into the cavity and retained there by some cotton which had been dipped in the oil. After some minutes a sense of cold and numbness ensues, and the pain rarely resists."

In the report of the proceedings of the British Association for the Advancement of Science, (*Dublin Med. Press*,) it is stated that "Professor Owen made some remarks upon the dentition of the gorilla. The deciduous or milk dentition in the youngest specimen is something similar to that of the human child, but with some differences, which he described. The dentition of the young gorilla corresponds best with that exemplified in the human child between the eighth and tenth years. The difference, however, is shown in the complete placing of the true molar, while the premolar series is incomplete."

The following case, reported in the proceedings of the Buffalo Medical Association, (*Buffalo Med. and Surg. Journal*,) affords a striking example of the serious disturbance which may be produced in the animal economy by an apparently trifling abnormity, and the beneficial effects of simple but appropriate treatment. "Prof. Hamilton presented, for Dr. C. W. Harvey, a specimen of '*exostosis of a tooth.*' The patient, a gentleman, had suffered for many years from what had been supposed to be neuralgia, which finally produced insanity. Under these circumstances, he was brought to Dr. Harvey to have a tooth extracted. With great difficulty, and only after applying extraordinary force, he removed this tooth, which was found to be sound, but there is seen attached to it, growing from its roots, near the crown, a round, smooth, solid tumor of bone about the size of a filbert. 'The neuralgia immediately ceased, and the patient was soon restored to sanity.'"

Dr. L. C. Levoir states (*Chemical News*) that "Vulcanized India-rubber, which is worn out until it has become as brown as the pure caoutchouc, still contains an appreciable quantity of sulphur."

In a paper on the Chemical Manufactures of South Lancashire, (*Ibid.*, Sept. 21,) Drs. Schunck, Roscoe, and Smith treat of the production of disinfectants. The following is of more immediate interest: "Mr. M'Dougall manufactures, near Oldham, a disinfecting powder, in which the properties of carbolic and sulphuric acid are taken advantage of. This is used to prevent decomposition in stables, cow-houses, and among accumulations of putrescible matter, and generally for the prevention of decomposition in manures. A liquid is also prepared with carbolic acid and lime-water, which is applied for the purpose of preventing decomposition in sewers, according to the idea entertained by one of us, of purifying whole cities by preventing the generation of gases, in sewer water, or among accumulations of animal refuse. The liquid is also used to prevent the decomposition of animal matter when it cannot at once be made use of, especially in the case of meat brought to market, or animals that have died in the field. The solution of the powder has also been used, to some extent, in dissecting-rooms, where it immediately destroys any noxious smell, and at once liberates the fingers of the operator from the peculiarly nauseous odor which so often attaches to them."

The *Chemist and Druggist* has the following on electro-plating, which, though quite elementary, may prove useful to some of our readers: "When an ornament of white metal is to be coated with silver by this means, the metal foundation, properly prepared, is dipped into a chemical solution of silver, and a galvanic current is passed through it. The result of this action is, that the solution is decomposed, and a fine film of metallic silver becomes deposited on the surface of the article suspended in the liquid; the thickness of the deposited layer being determined conjointly by the duration of the immersion, the strength of the solution, and the strength of the current. In the progress of the operation the solution becomes exhausted of its silver; and to keep up the supply, plates of pure silver are suspended in it; the silver dissolves in the liquid as rapidly as the deposition on the articles takes place, atom for atom."

The *Scientific American* states that "an ingenious German has invented and patented a tack hammer that lifts its own tacks, heads up, and there they hang until driven home to their appointed duty." This principle may be of practical application in the manipulations of dentistry.

The same paper says that "Zinc may be purified by melting it with an equal quantity of lead in a deep iron vessel, stirring the two metals together, and skimming off the impurities as they rise to the surface. Powdered charcoal must be constantly placed on the surface of the molten metal to prevent oxidation. After keeping the two metals thus fused together for about three hours, the lead descends to the bottom on account of its greater density, and the zinc floats above it, and may be drawn off by a pipe at the side of the iron smelting vessel."

In his gleaning from the German journals for the *Amer. Jour. of Pharmacy*, Mr. J. M. Maisch gives the following on the composition of gutta-percha: "E. H. v. Baumhauer found gutta-percha to consist of $C_{20}H_{16}$, and several products of oxidation, among which he proved to be $C_{20}H_{16}O$, $C_{20}H_{16}O_2$, and formic acid. Oxidation is the cause of gutta-percha becoming brittle."

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The *Physician's Hand-Book of Practice* for 1862. By Wm. Elmer, M.D. New York, W. A. Townsend.

This is the most elaborate and complete work of the kind published. It is neat, compact, and so conveniently arranged as to meet very fully the special requirements of the practicing physician.

THE

DENTAL COSMOS.

NEW SERIES.

VOL. III. PHILADELPHIA, DECEMBER, 1861. No. 5.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

We received a communication from Mr. D. R. Greenlee, dentist, of Meadville, Pennsylvania, on the Spontaneous Absorption of Dentine, in which he details a case which came under his treatment in 1858. It was the right superior front incisor, entirely sound, except a bright-red spot on the posterior part of the tooth, corresponding with the terminus of the pulp; after some little delay he punctured the tooth on the palatine surface, and found the dentine of the greater part of the crown entirely absorbed; bright arterial blood followed his instrument; he destroyed the whole of the pulp; and in ten days plugged the root and crown of the tooth. What seems to me singular about the case is, that he found the foramen at the apex of the root very large, and the patient was eighteen years of age; he reports that at the time of writing, October 2d, 1861, the case was doing well, which was after a lapse of about four years. This case corresponds with one which we reported in the July number of the *Dental News Letter*, of 1854, except that the foramen at the apex of the root seemed to be of normal size; the case we reported at that time is still in a healthy condition. The absorption of dentine has certainly become a very interesting subject to the dental practitioner; our first studies in the profession led us to believe that this phenomenon stopped with the absorption of the roots only of the deciduous teeth, but observation soon led us to a very different conclusion; we first observed that the crowns of those teeth were attacked where they were held *in situ* by lateral teeth, and in some cases the attachment of the pulp to the walls of the cavity, as it enlarged, was sufficient to hold the crown in place long after the roots were entirely gone. We referred to this matter on several occasions. We next observed that adult teeth gave trouble after plugging, although the pulps were not exposed at the time; this fact we referred to the absorption of the thin bony plate between the pulp and the plug, but we doubt whether it was believed by any in the profession until recently. This experience caused us to doubt the soundness of the practice of plugging a tooth where there was slight exposure of the pulp, with a hope that dentine would be deposited, or that a thin plate of bone would increase in thickness and protect the pulp. The absorption of the dentine of the crowns of the adult teeth by their pulps is not the only matter of interest to the dental practitioner. The absorption of the apices of the roots and the necks of teeth immediately under the margins of the gums is very common; we have reported cases where the pulps became exposed by absorption of the dentine of the necks of teeth. A very interesting case of absorption of the roots occurred to us a short time since: a young lady, twenty-one years of age, called to consult us with reference to pain along the side of the face, but principally in the region of the second superior left molar; it had but a very small gold plug in the centre of the crown. The gums looked healthy, she had good teeth, and was of a well-balanced temperament; never sick. She applied to her medical adviser, who prescribed remedies for neuralgia; getting no permanent relief, she called to see us again. The pain at this visit was more concentrated in the region of the tooth referred to above. We concluded to extract it; when we placed the forceps on the tooth, and attempted to grasp it tightly, the crown of the tooth sprang into the beaks of the instrument, without any effort at extraction. When we examined the tooth, we found that the roots were entirely absorbed, as though it were a deciduous tooth; there has been no pain since. Close and careful observation would, doubtless, disclose many interesting phenomena about the teeth, which otherwise would be overlooked.

DECOLORATION OF TEETH.

BY C. P. FITCH.

In a communication to the November number of the Dental Cosmos, I closed that article by raising the following questions: What conditions of teeth are susceptible of decoloration? and what agents are best suited for this purpose? I propose, in the present paper, to examine somewhat briefly these questions.

There are certain conditions appertaining to tooth structure, which any attempt to modify or change by chemical or mechanical agencies, with the design of improving the complexion of such structure, and, at the same time, preserve it entire, would be attended with chagrin and defeat. Any such endeavor must involve the integrity and perpetuity of the organ.

The conditions above alluded to are the legitimate results of normal, organic, or functional acts, developing and preserving the part; or the sequences of abnormal, constitutional processes, defeating the production of healthy tooth substance. Wherever coloration depends upon the presence of matter incorporated into the structure of a tooth, either in original or secondary formations, a change of color from any treatment must not be expected. Hence, in the consolidation of the dentinal tubuli, producing a dark, opaque appearance, it would be folly to attempt to meet this indication by any constitutional or local means whatever, with a design of the restoration of the texture to its original color. Nature must not be interfered with in any such sense, but left to carry on the occult acts of assimilation and elimination in her own special modes. True, in the growth of these harder tissues we may understand the elements entering into their structure, and note their deficiencies so as to make the necessary contributions of supply, in crude material, but with nature herself remain the acts of appropriation. We shall never be able to look in upon the hidden laboratory of her internal being, either to observe or control her primal, organic and functional laws, so as to dictate a definite structure, or demand the surrender of a single atom or molecule, without great danger of compromising structural existence, by a contravention of these laws and her own peculiar modes of being.

The conditions of teeth susceptible of decoloration are those which, generally, result from local, abnormal processes, introducing foreign substance mechanically into the tooth. Just at this point opens a somewhat extended field of causes and results, which, in a peculiar sense, demands from the dental practitioner a thorough exploration and an appropriate treatment. The principal source of coloration arises from the death of the endodonteum, however caused, and from the elements entering into certain kinds of material employed for stopping teeth. No doubt the products of decomposition are very often taken into the dentine by tubular imbibition, deleteriously affecting its appearance. No reference is now had to decay, lodged in the cavity of a tooth, which always colors the tooth, more or less, when present—this is supposed to be removed in the initial or preparatory steps for stopping, but allusion is had to that leaching process, by which coloring matter is taken into the structure with the secretions of the mouth. It must also be borne in mind that there is a slight difference in color between those teeth whose nerves are destroyed, and the act of normal tubular circulation arrested, and those whose central cavity remains closed, and whose endodonteal membrane is living and healthy. All the bleaching agents in the universe would not restore the former to their original delicate shade of color; but a very close approximation may be made. As it regards these foreign particles, introduced from various sources into the dentinal structure, it appears to me that their removal is quite feasible. These substances are lodged or held in this structure mechanically, and may be most generally washed out, or their character so changed as not to be detected. This, it may be remarked, is alike true of all coloration arising from the aplastic materials of the blood, as well as that resulting from the metallic oxides of mercury, silver, tin, etc. If these substances were incorporated into tooth structure, so as to become a part of its living organism, this result could not be effected without a loss of essential substance, and the consequent partial or entire destruction of the organ; but as this is not the case, we therefore maintain that this foreign matter is susceptible of removal or change, without the loss or destruction of any organic constituent of the tooth, whenever certain chemical or mechanical relations are established by an exhibition of appropriate agencies.

The question, then, recurs, what agent or agents are best suited to remove or change these coloring particles, without compromising the structure of the tooth itself?

I will, at this point, detail the results in connection with experiments or tests to which I have subjected human teeth out of the mouth. In the first instance, the teeth selected were the deciduous front incisors, displaced from the same mouth by a blow, fracturing them at a point but a few lines removed from the apex of the root. It will be noted that they were identical in color. One was exposed to the action of a weak solution of the cyanide of potassium; the other to chlorinated lime, in solution. After a few hours' exposure to the action of these agents, and, on removal, the following results were found to have occurred: the tooth exposed to the chlorinated lime was slightly whitened; while the other, subjected to the cyanide of potassium, was changed to a deep mahogany color.

Two central incisors and a molar, taken from the same mouth, were then subjected to the action of the same agents, with precisely the same results. Here, then, in the one was a deep uniform mahogany stain produced, and in the other a decided bleaching result exhibited. Apparently, the inorganic or mineral substance of these teeth remained perfect, suffering no loss; and to ascertain the effect upon the organic or animal portion, sections of these teeth were exposed to the action of dilute hydrochloric acid. By removing the inorganic matter with the acid, the condition of the organic substance would decide the point as to the fact whether any change had been wrought upon it by these bleaching agents, although the precise nature of the change by this experiment could not be ascertained. The animal part of the tooth acted upon by the chlorinated lime, so far as could be detected by the eye, was not in the least affected. The residuum was a tough, cartilaginous substance, differing in no respect from that obtained by exposing any human tooth to the same acid test. But how with the teeth subjected previously to cyanuret of potassium and then to the acid? In an instance where the solution of potassium was very strong, a very small quantity of an albuminous or jelly-like substance was the residuum; but with a weaker solution, a cartilaginous material was left — in the former instance showing most conclusively that the organic part of the tooth had sustained the loss of some essential element by the action of the cyanide of potassium. This result is, undoubtedly, due to its caustic nature. The mahogany color induced is most likely due to the union of cyanogen with some of the organic elements of the teeth, evolving a substance very similar to purpurine. A further reason, we apprehend, against the use of this agent, as a tooth bleacher, is the fact of its toxicological results. It is decidedly an active, deadly poison. Medicinal dose, one-eighth of a grain exhibited in half a fluid ounce of aromatic water. In Dunglison's work on new remedies, it is stated that three grains will produce human death in a short time. An eighth of a grain will destroy a linnet in a few seconds. Photographers have been killed by taking a swallow of this solution through mistake. It is but little removed from hydrocyanic acid in virulence and activity. Still another more fatal objection to its use arises from the fact that hydrocyanic acid is rapidly evolved from the union of cyanogen and hydrogen. This is one of the most fatal and active poisons of the entire list of toxicological bodies. According to Christison, one and a half grains is sufficient to produce death, in a very short time, in the human subject. One or two drops will destroy a vigorous dog in a few seconds. Therefore it is exceedingly unsafe to expose teeth in the mouth to the action of the cyanide of potassium, however small the quantity, from the union of which and hydrogen prussic acid is so readily evolved.

During a conversation with a gentleman, a professor of chemistry, connected with one of the medical colleges of our city, the subject in reference to the use of cyanide of potassium, as a tooth bleacher, came up. It was not regarded by him as a bleacher of vegetable or animal substances in any respect. But, on the other hand, he considered its exhibition for any such purpose, extremely hazardous. It is true, cyanogen unites readily with many of the metals such as tin, iron, silver, mercury, etc., forming soluble compounds. On this account it is frequently employed to remove metallic stains from various textures and surfaces. For this reason it might, at first, be thought a fit agent to apply to the teeth for the removal of such stains. No doubt it would do it. But it would very likely leave its own stain, and most certainly endanger the life of the subject. If adopted by the dental profession generally, it is to be feared that many sad instances would be recorded of its poisonous nature.

I made a variety of experiments upon teeth colored by different agents, previous to their removal from the mouth, by exposing them to the action of the following articles: chlorinated lime, chloride of calcium, chlorinated soda, or Labarraque's solution, chloride of zinc, and others.

No apparent effect was had upon these teeth by any of these agents, with the exception of chlorinated lime. With it, a decided bleaching result was obtained. It but slightly exerts its peculiar bleaching properties when used dry; but in solution its bleaching power is rapidly manifested. It is not a caustic, neither is this the case with any product arising from its exhibition to teeth in the mouth. Therefore, the organic part of the tooth is safe under its action. Should there be any hydrochloric acid formed with chlorine and hydrogen, it is at once neutralized by the lime; therefore, the inorganic constituents of the tooth must remain unaffected. As these two elements constitute about all there is to a tooth, it is fair to conclude that the tooth itself must come out of this bleaching ordeal unharmed. I have, for some time, with considerable satisfaction, employed chlorinated lime for whitening certain classes of teeth connected with the oral cavity. Teeth colored from the aplastic materials of the blood, pus, etc. may be treated with a solution of chlorinated soda, with decided advantage, previous to using the lime. It should be thrown into the tooth with considerable force by a syringe. Cotton saturated with a strong solution of chlorinated lime, very recently prepared, may then be introduced into the cavity of the tooth, and the cavity hermetically sealed, or as nearly so as possible. A few applications will generally suffice to test its bleaching properties. It is, in all respects, the best tooth bleacher of which I have any knowledge. If any one has a better, certainly a record of it should be made. In addition to its bleaching properties, it stands first on the list of disinfectants; therefore, its application becomes highly serviceable in certain conditions attending many of this class of teeth. Whether its bleaching power is due to chlorine or oxygen, as some maintain, or both combined, I will not undertake to say. This question I leave for settlement to the chemical student. But the fact, or bleaching result, is a very great desideratum in dental practice; and the properties of this and other harmless agents are well worth testing in attempting the restoration of teeth to normal or healthy complexion.

PHILADELPHIA, November 9th, 1861.

REFORMATION.

BY J. S. LATIMER, D.D.S.

In a few short years, the dental profession has worked its way up from quackery to a place among the scientific and honorable professions. To the self-sacrificing efforts of a few immortal Americans is this advancement chiefly due.

All honor to those noble men! Their watchword is "ONWARD." Let every member of our benevolent profession adopt that word, note his own and the profession's wants, and go to work in earnest to correct the faults.

Time was when barbers officiated as dentists, and physicians resident in country villages carried a dozen bungling instruments in their pill-bags for the purpose of plastering with amalgam the decayed dentals of the r patients. But with the advance of a knowledge of our profession, through our conventions, colleges, and journals, came the call for a higher grade of attainment, and the time has almost passed in which men with little general education, and but a few weeks' pupilage, can take place in the ranks and be recognized as dentists.

This advancement is gratifying, but we must not cease our efforts; there is yet much to do and dare. Our local societies should be increased, all jealousies suppressed, and more scientific investigation should precede the discussion of questions coming before our conventions. In this connection, let me remark that the senseless bickerings of those in rival interests who control some of our journals, do much to disorganize societies by creating jealousies. Let us hope the practice of filling valuable space with the venom of personal pique will soon cease to deprive subscribers of the useful matter they have a right to expect.

Our colleges, too, require remodeling, occasionally, to suit the requirements of the times. In the first place, let us notice the present terms of graduation, which, being fulfilled, the subject is thrust out upon the community as a proficient.

1. A two-years' private pupilage is required of the matriculant.

2. He shall attend two full courses at the school granting the diploma, or one term in any other respectable medical or dental school, or five years' practice will be taken in place of one of the terms at the institution issuing the diploma.

3. It is further stipulated, that the applicant shall have passed a satisfactory examination by the Faculty, and paid the required fee.

Now, it is notorious that very many go into the machine with the merest fraction of mental and moral qualification, and that they come out improved, to be sure, but far short of the mark. This result, so injurious to the credit and advancement of the profession, is the fault, mainly, of the basis on which the terms of graduation are founded. In truth, it is seen as much in the medical profession as in ours, and the Faculties of our colleges have no precedent for unusual acquirements. I believe it is not too much to say that the teachers of our several colleges are as sincerely desirous of improvement in this direction as any can be, and yet they cannot well break away from former usage until the profession is ready for the advance.

> "The slaves of custom and established mode,
> With pack-horse constancy we keep the road;
> Crooked or straight, through quags or thorny dells,
> True to the jingling of our leader's bells."

Let us illustrate by taking two examples.

Messrs. A. and B. apply for tickets of matriculation. Young A. has faithfully served his father, from whom he acquired the useful and honorable art of stone-cutting, for which occupation he is eminently fitted.

But an itinerant quack, calling himself a dentist, spends a few days in his village, and young A. falls violently in love with the "trade" so easily learned, and which pays so well, while it enables him to dress so nicely every day, and elevates him above the wielder of the mallet and chisel. He stipulates, pays down the fee, dons his Sunday clothes, and sets about discovering the "crooks of the wrist" by which his professor gets so much money.

In the space of three weeks, or thereabouts, he can ape his master's bow and smirk; can repeat the circumlocutions by which the professor explains to wondering patients the cause of toothache, and has, indeed, learned many other items, too numerous to mention. To be sure, the professor's library is confined to a few antiquated copies of the *News Letter*, issued before its publishers required "cash in advance;" but no matter, Mr. A. has neither time nor inclination for study—indeed, never did have. His father was one of those who had little faith in the lore of schools, and did not supply mental pabulum for his children in the shape of suitable books and papers. The few weeks of pupilage expired, the student becomes the partner and exalted sharer of the gains accruing to itinerant dentists. Thus two years come and go, when the senior, too fickle to follow one pursuit for any considerable time, intimates his desire to retire; whereupon our junior buys out his partner, and "sets up for himself."

Inspired by the supposed pecuniary advantage resulting therefrom, our hero, at the end of four years and eight months from the day when he abandoned the mallet for the forceps, is seized by a sudden ambition to "be seized" of a title, and straightway he calls on the dean of a college, presents his certificate relative to time of practice, pays the fee, and enters upon the arduous task of trying to learn anatomy, physiology, chemistry, pharmacy, therapeutics, metallurgy, operative dentistry, and mechanical dentistry, all in four months!

Study is a new thing to him, but he struggles hard and gets a smattering of each, besides inserting a dozen plugs, and making three silver plates on which are set plain teeth.

Mr. A. is examined with the rest, and with the admonition that the collegiate course is only the commencement, and that a systematic course of study is alone able to perfect the pupil, the Faculty receive the fee and grant the diploma, which declares that they deem Mr. A. competent "to enter upon the practice of dental surgery." To be sure, he vows within himself that he will be exceedingly studious in after-years, in order that he may master the long, hard names found in a bran-new book labeled "Wilson's Anatomy;" but, in truth, a leopard can change his spots easier than Dr. A. can become a habitually studious man.

Let us now examine the case of Mr. B. The child of wealth and luxury, petted, pampered, and spoiled in childhood, he has grown up with little idea of self-denial. With every opportunity and advantage that wealth could give for obtaining a superior education, his want of industry and his love of pleasure have prevented the attainment of anything more than the merest smattering, for the glimmering of an idea satisfied him, and he gave it no further thought. Unlike Dr. A., he has a fine address, is cleanly, and has a faultless physique; but he lacks patience, industry, studiousness, constructiveness, concentrativeness, perseverance, and, last but not least, he is terribly deficient in common honesty. If we add to this the fact that he is known about town as a wild and fashionable debauchee, the picture is complete.

This Mr. B. studies dentistry with an uncle; or, more truthfully, he *stays* with his uncle during two years, at the end of which time he has a strong regard for the operative department, which he has *not* yet attempted, and a decided distaste for the mechanical, which he has attempted. The son's ambition does not incline him to dive deeper into the mysteries of a laborious profession, but the father and the uncle are solicitous, and he goes to college. The first term is devoted to frolic (which is only another name for vice) and a sleepy inattention to the lectures, some of which he attends.

The second term is like unto the first; the would-be doctor, and those like him, being the centres of attraction to disreputable females, by which, and their carousals, they disgrace the college and their profession. But, toward the close of the term comes the fear of failure to get a diploma, and thus stimulated, he works well, and passes a creditable examination—thanks to his excellent memory and vivacious intellect. But, the incentive to his extraordinary exertions being now removed, he falls into his former habits, and goes forth no less a *roué* for the parchment letter of recommendation addressed to "whom it may concern," which is to open the door of the public heart and admit him to positions in which he can do the most harm.

Is it not plain in both these cases the profession and the public are irreparably injured by the lack of discriminating power on the part of the Faculty?

It is patent that physical fitness is almost as essential in the dentist as mental capacity, and that these are no more important than the habits and morals.

I throw out these hints more for the purpose of calling attention to the matter, and getting the suggestions of others, than to present any definite plan which may bring about the desired reform.

May we not hope the time is not far distant when dentists shall consider this matter of adaptability, and refuse to receive as private pupils those who are decidedly deficient in this respect?

NEW YORK, November, 1861.

SECRETION.

BY WM. H. ATKINSON, M.D.

This term—from the "Latin *se cerno*, *se* and *cerno*, to separate"—like most terms used to express life-actions, is but partly capable of defining the true meaning of those calling them to their aid. In strictness of language, this term means to hide from or divide from, se-par-ate, move from its parts; and this does but half express the true intent or function thus denominated.

All organs capable of secretion are aggregations of their parts, which, in their primary or unitary presence, perform the act called secretion. Mere percolation is not a vital act at all, and yet this alone often passes for the true expression of secretory organs, and just here the subject is complicated and occult to such extent that it is not much marvel that no better understanding of it has obtained among men who give it attention. Percolation is the fractional expression of secretion, just as solidification is of crystallization; it must be present, but if nothing further take place, we have no proper secretion. Glands and follicles are endowed with the mysterious power of attracting the plus something from the surroundings that make secretion complete.

The difference between secretion and excretion mainly is, that the latter is the expulsion by percolation of the former, and usually after it has fulfilled its mission, and when, if not expelled, would itself set up disintegrative actions.

It was formerly asserted that the products of the various glands were or might be detected in the blood, which, however, of late has been less strenuously advocated, for want of the proof. It appears now, from the latest observations, that the same blood identically, that if presented to the parotid or buccal glands, would produce saliva, if presented to the mucous follicles would only give out mucus; or, if it were passed through the liver, bile would result; or, in the event of its being presented to any organ in need of repair, would as readily be changed into the proper tissue of that organ, whether it be fine or coarse, high or low, in the scale of life-force and function, from the lowest condensed cellular to the highest and finest filamentous nerve-tissue.

Secretion, in one of its phases, is a necessary part of a true nutrition or imbibition of the necessary plus entity, or something to keep up the harmonies of function, that is denominated health.

The crude, natural perception, unaided by the power of glasses or the imagination, cannot apprehend any vital act in its unitary, or first, simplest manifestation; but when our powers become thus aided, we may detect the real agent at work, although itself not apparent, so as to be daguerreotyped palpably upon our retina, yet capable of impingement upon the sensorium. It is somewhat like the currents of atmosphere denominated wind, not visible to our eyes, but by its effects on the ponderable and opaque things that are visible to us. Secretion properly presides over fluids, semi-fluids, and solids in the states of transition from and to the solid state; for, as to absolute solidity, it is only matter of conception in the mind, but utterly impossible in a truly philosophic sense.

Whatsoever is seen is mutable and fractional, not whole nor complete, and therefore capable only of imperfectly expressing any absolute principle; were this not so, there could be no differences in nature or in mind. This should reconcile us to our fractional state and stimulate us to emulate the little glandules, follicles, and molecules in hopefully fulfilling our functions, that we may be advanced by the laws of progression that are every day becoming more and more understood and acknowledged, so that our whole natures may be freed from imperfection of any function of any part of the secerning system, or any inharmonies of the whole correlation of organs, that in the aggregate, when in their highest and completest actions, produce the only status of health that can properly be so called. Secretions all in full normal play will go very far to insure efficient ability for any and all the functions of the living body, and truly prepare us to advance.

NEW YORK, November 7, 1861.

SOFT SOLDERING.

BY J. D. WINGATE.

THIS sort of soldering, for dental plates, is not very commendable, but often quite convenient. It should be resorted to only when haste is necessary, or when it is not desirable to heat up the plate, and then only to solder the rivets where a tooth or teeth are off, and the lining unbroken. One of the reasons why soft solder is not sufficiently strong to solder breaks or splices is, that the metal of the plate will not sufficiently incorporate itself with the solder at so low a temperature. Solder and plate can only be made to adhere tenaciously when the fusing point of the one is not much lower than that of the other. Then the surface of the plate will unite with the solder, and the united surfaces will adhere firmly.

Pure block tin is the only suitable metal for soft solder, for dental purposes; any alloy that will melt at a lower heat is unfit.

A few plain directions to those not accustomed to using it may here not be out of place. When the tooth is satisfactorily fitted on the plate, apply a little fluid chloride of zinc to the rivets, then rivet as firmly as the tooth will permit, apply a little more of the soldering fluid and a small piece of tin on each rivet, and place the plate on a piece of charcoal, such as is prepared for hard soldering. Blow a small fine blaze on the plate, near the place to be soldered, changing it so as not to blow too long in one place. When the plate is nearly hot enough for the tin to melt, the blaze may be put on the solder; it will soon sink down along the rivets, and make a pretty strong job. To hurry it up, cold water may be applied to the plate. It need not he heated to discolor the plate or teeth very perceptibly. The fluid should be used as sparingly as possible, as the depositing of the zinc from the fluid on the plate, where it cannot be rubbed off, causes with the saliva a galvanic current very disagreeable to the taste. The tin, should any remain outside, must be carefully scraped off, and the place polished and burnished. As it is seldom found for sale, any one may manufacture it with very little trouble. Dissolve, out-of-doors, in a few ounces of muriatic acid, zinc to saturation, and add a little muriate of ammonia, if you have it, and it is ready for use. Besides being a soldering fluid, it is a very excellent toothache remedy.

Should it become necessary afterward to hard solder a soft-soldered plate, the soft solder must first be carefully removed, or it will dissolve the lining, and even the rivets. This may be done, if the plate is gold, with dilute nitric acid; but for silver, hydrochloric, or some other acid that will not dissolve the silver, can be used. Then, by using borax, the places may be soldered with hard solder.

Bellefonte, Pa., November, 1861.

ATMOSPHERIC PRESSURE PLATES.

BY J. ALLEN.

There seems to be a confounding of ideas among dentists in reference to the words suction and atmospheric pressure.

These words, when applied to artificial dentures, are often used as synonyms by many practitioners, which lead to an erroneous theory in reference to the practical effect of an atmospheric pressure plate, when applied to the mouth of a patient. But there is a shade of distinction between these words, for although suction seems to imply atmospheric pressure, especially when used in connection with fluids, yet atmospheric pressure does not always imply suction; because the effects of the former are as apparent upon solids as they are upon fluids.

For example, take two or more slabs of marble, plates of glass, steel, or any other substances, (not porous,) and let them be fitted together so accurately as to expel all the air from between them, and it will be found that the external pressure of the atmosphere will hold them firmly together with a force equal to fourteen pounds to the square inch. This is well understood by almost every one, and yet there are those who seem to think that a set of teeth inserted upon this principle merely hangs upon the mucous membrane of the mouth by a sort of suction, and that there is a constant sense of weight experienced by the wearer, which is augmented just in proportion to the increased weight of a set of teeth; and, therefore, the lighter the denture the less weight will be felt by the patient.

This is an erroneous theory, arising, probably, from a misconception of the term suction; for, if a plate be accurately fitted to the mouth, the wearer does *not* experience the hanging or pulling-down sensation that the term would seem to imply; for the sustaining power bears upon the opposite side of the plate, and holds it up firmly to the roof of the mouth. A well-adapted plate simply becomes an intervening substance between the palatial arch and the atmosphere, displacing the latter from direct contact with the former. The atmosphere then rests upon the external surface of the plate, instead of the living tissues of the mouth; but this pressure is no greater in consequence of this intervening plate than it would be without it. An ordinary-sized plate has about five square inches of surface; the pressure upon this surface is about seventy pounds, which is no more than that which rests upon an equal surface on any other portion of the body. "So great is this pressure that the force exerted upon the entire body of a moderately-sized man is estimated at about fifteen tons," and yet we do not feel this pressure, because of the equilibrium and perfect elasticity which presses everywhere alike; neither do we feel any more weight or pressure from the plate than if it was not in the mouth. "By this same principle insects walk upon the ceiling, and the patella or limpet, and some other shellfish, hold fast to the smooth rocks." Here we have presented to us a plain philosophical principle, governed by a well-known law of nature, from which we draw the following deductions, viz.: That if an upper denture be accurately fitted to the mouth, it will be firmly held there by atmospheric pressure, and that this can only be overcome by leverage, or the intervention of some substance between the plate and roof of the mouth, (as air or liquid,) or by the force of gravitation. If the fit of a plate be perfect, and the teeth are correctly articulated, it will seldom yield to either of the former with ordinary use, and as to the latter force, (gravitation,) it would require as many pounds weight, besides the teeth, to dislodge it, as there are pounds of atmospheric pressure resting upon the external surface of the plate which holds it, provided the weight hangs true so as to not slide the plate, which would let in the air. Therefore a few pennyweights, more or less, is of no practical importance in a set of teeth. But we are told that an air chamber is essential, in order to form a vacuum, and that the atmospheric pressure depends upon this vacuum; and they refer us to the common leather sucker, which the boys use for a toy, in support of their theory. But let us look at the philosophy which sets forth the true principle: it tells us that the power that holds the sucker to the smooth stone is atmospheric pressure upon the external surface, and that nature abhors a vacuum, and gives it no credit for holding the leather down; and philosophy asks, where is the vacuum between the two marble slabs that are firmly held together by this principle? But we are asked, if we never form a cavity in our plates? We answer yes; and for two reasons: First, the central portion of the palatial arch is usually harder than the gum, which (latter) will yield more readily to pressure in masticating, and will cause the plate to rock across the harder portion of the mouth. This is prevented by raising the plate. And, secondly, if the whole of the atmospheric pressure which rests upon a denture is brought to bear upon the outer portion of the base, it is more firmly secured around the edges of the plate than if a portion of the pressure also rests upon the centre of the arch. We have here presented only a principle which, if properly employed in the construction of artificial dentures, is of great importance; but the practical details of its application require very accurate manipulations, which we have not room here to present, but may hereafter.

New York, November 15th, 1861.

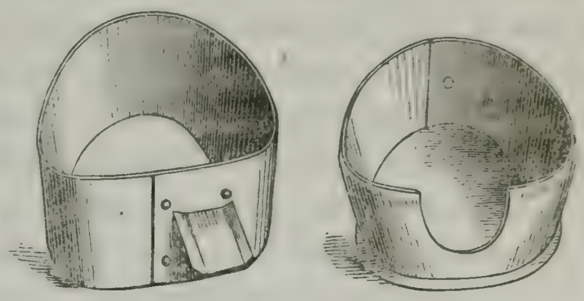
METALLIC DIES FROM PLASTER IMPRESSIONS.

BY A. M. HILLS.

So much has been said, of late, on this subject, that I feel a delicacy in bringing it before the profession at this time; but my excuse must be, that I have tried all plans which have come under my observation, and, for some reason, have sometimes failed in all: but I have made experiments until I feel satisfied that I have attained a very excellent method, although some may have a better one unpublished.

I take my impression in a common wax impression-cup, (of S. S. White's pattern,) mixing equal parts of plaster and pulvis. feldspar, or ground silver sand, (the spar is better but the sand will answer,) and mix with water to a proper consistency, then stir it until I perceive signs of setting; I then pour it into my impression-cup, and arrange it the shape of the arch to be taken, and apply it to the mouth as soon as possible; pressing up firmly and pressing it in on the cheeks and lips all around, removing the impression before it gets very hard, if there are any teeth remaining in the mouth, but letting it set well if the arch is unobstructed by scattering teeth; I then trim the plaster just to suit the rimming, if a rim is desired, and if not, no trimming is necessary; then tap gently a few times on the handle of the cup, and the impression will fall out into the hand.

It is now ready for the ring and luting. The rings are made of Russia sheet-iron, one ring and one cap; the ring should be made large enough at the small end to leave a space all around the impression of about one-fourth of an inch, when the impression is placed inside of the ring, about one and three-quarter inches deep, with just enough taper to permit the cap, which fits in the large end, to go over the small end of the ring. The cap is made with the large end just large enough to fit tightly over the small end of the ring, or inside of the large end; this cap should be about one and one-half inches deep, tapering almost one-half, and the small end closed up by a cap rimmed on and neatly fitted down; in the posterior part of this cap, at the open end, should be a half circle, one inch deep, cut out, in which the melted metal is to be poured when the ring and cap are placed together.



Now I have the cap, ring, and impression. Place the cap, open end down, on the table, and lay on it two thicknesses of newspaper, then lay the impression on it, face up, and place the ring, with the large end down, over the whole, and press it down until the upper edge of the ring is about even with the rim of the impression, and lute around with equal parts of plaster and silver sand. When nearly set, draw off the ring and impression from the cap, and invert the ring, and lute the other side well; it is now ready for the oven, where it can be thoroughly baked, which will take from twenty minutes to one hour, according to the intensity of the heat. My rule for testing, when the moisture is fully expelled, (which I obtained from a former number of the Dental Cosmos,) is to place the ring on a smooth surface of cold metal, and when it ceases to deposit moisture it is ready for the melted metal, which should be poured as soon as the ring is just cool enough to be handled with the bare hand. Place the cap over the impression and bind them together with a small wire, and place them on anything that will keep the ring from rolling over, (I usually use my casting ring for the lower jaw,) with the opening in the cap uppermost. Now pour the melted metal carefully into the half-round opening, which is at the posterior part of the impression, filling it full; now place the soldering lamp with the blaze against the upper edge of the cap, and with the blow-pipe throw the blaze on the metal in the half-round opening of the cap, and thus keep the metal fused at that point until all danger of shrinkage from the face of the castings is past. When fully cooled, separate the ring and cap; wash out the plaster impression; invert the ring, putting the large end over the cap this time, to give more lead around the die.

I have practiced the above plan of obtaining metallic dies and counter dies for the last two years without a failure, and am confident, if it is strictly followed, it will meet with the approval of the profession.

Clearfield, Pa., November, 1861.

Entered, according to Act of Congress, in the year 1860, by Jones & White, in the Clerk's Office of the District Court for the Eastern District of Pennsylvania.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

BY DRS. CH. ROBIN AND E. MAGITOT.

[Translated for the Dental Cosmos. from the "*Journal de la Physiologie de l'Homme et des Animaux,*" Dr. E. Brown-Séquard, editor, by E. Sureau.]

Manner of the appearance of the canaliculi of the ivory.—At the time when this union of these cells by their corresponding faces takes place, it can be observed, no matter how thin the bed of ivory may be, that there is always a free space at the level of the angles or corners of each cell where this fusion of substance does not occur. These spaces appear in the form of orifices on the thinner parts, where they have been already described, and in the shape of canals in the thicker parts. We have also mentioned that these openings are star-shaped, and have a width which is relatively considerable—they are the first appearance of the dental canaliculi. Produced in the manner that we have just described, these canaliculi already exhibit, short as they are, a proper wall which can be separated from the interposed dental substance, and to which they adhere.

That the canaliculi exhibit one or two subdivisions, from the time that they reach three or four hundredths of a millimetre in length, (pl. xi., fig. 2, *a*,) is also proved by the succession of the phenomena of development, the ultimate mechanism of which we will soon consider.

It is not our intention in this place to expose the various hypotheses on the manner of the appearance of the dentine, which have confounded what concerns the origin of one part and the development of another. The history of this question has been already given by one of the authors of this treatise. (E. Magitot, *Développement et structure des dents*, Paris, 1854, quarto, p. 37.)

As it has been demonstrated in the course of description, it is only necessary for us to repeat that the ivory is not bone, as it was considered by the ancients, and as M. Flourens and some other modern authors still persist in believing. (*Cours de physiologie*, Union médicale, 1855, p. 499.) Neither is it the product of the secretion of the bulb. (Raw, Huxley, Cuvier, Oudet, etc.) Nor is it owing to the direct transformation of the bulb into ivory. (Nasmyth, Owen, Hannover, Tomes, Kölliker, etc.) Neither is it the result of a *deposition* of special fibres at the surface of the bulb. (Raschkow, Huxley.) The elements of the formation of the ivory, that is, the cells of dentine, originate spontaneously by genesis at the surface of the bulb which furnishes the materials (*blastema*) necessary to the genesis.

Thus constituted, each of the cells represents a living individual, a complete organism endowed with all the rights of property vested in the anatomic elements of the class of *products* of improvement—(see article PRODUIT, *Dictionnaire de médecine* de Nysten, 11th edition, by Littré and Robin, Paris, 1858, 8vo.)—that is to say, the vegetable properties of nutrition, of development, and of origin. Once developed, the cells experience the resulting modifications of the movement of molecular or nutritive renovation of which they are the seat. The nucleus and the caudal extremity disappear under the calcareous invasion, and the cell becomes a small mass of dentine. Then, the first lamina of ivory, formed of the metamorphosed cells, is subjected to molecular changes of evolution, from which result an increase of thickness and density, the production of globules of ivory, canalicular anastomoses, etc., of which we will presently speak. If the ivory is not recognized to be an inorganic, secreted product, it is equally impossible to admit that it is the result of the transformation of the bulb. The latter has no other office in this physiological action than to produce a *blastema*, in the heart of which the genesis of the cells occurs by virtue of a spontaneous and individual phenomenon, with the assistence and at the expense of which the ivory is soon produced.

What has been already stated shows how the *origin* of the substance of the ivory with its canaliculi is effected. We must now determine what are the essential phenomena of its *development*—phenomena from which result the increase of thickness, the modifications of the canaliculi, etc., and which, as we have shown, begin to manifest themselves as soon as the dentine *originates*, and even before the length of one entire cell has been employed in this genesis.

The *origin* and *development* of the dentine, although they can be simultaneously observed in the economy, are nevertheless phenomena of different orders by reason of their intimate nature, in the fact that the second can only occur when the first is already effected—in a description, therefore, the examination of these two phenomena should necessarily be distinct.

d. Development of the ivory.

The phenomenon of the *development* of the ivory begins, as has been already stated, as soon as the first cells are transformed into ivory at the summit of the bulb and while that transformation is effected uninterruptedly upon the sides, to the limits of the primitive cap of dentine. It is the result of a progressive and continuous assimilation of the special materials elaborated by the pulp—an assimilation of which the first formed bed of ivory is at the same time the agent and the seat, and the effects of which, we have already said, consist in the whole of the modifications which occur at the heart of the ivory from the moment of the completion of the first bed until the fall of the tooth.

The duration of the development of the ivory is considerable, for, commencing near the eightieth day after conception it does not terminate until an advanced age. In consequence of this, during the entire period of the dental evolution, the ivory can be seen completely formed on the culminant parts of the bulb, while the genesis of the cells is still observable upon the sides near the edges of the cap of dentine. There occurs, however, a moment corresponding to the completion of the external shell of ivory, (crown and root,) when there is no longer any trace of the cells, the genesis of which is then completed, while the development of the ivory continues during almost the whole of life.

The completion of the exterior dental shell causes a cavity at the centre of the tooth. This cavity is closed on all sides except at the point of the root, where the vessels and nerves penetrate into the organ. This cavity contains the dental pulp, which has changed its form with the changes of the tooth itself, while its volume, already considerably diminished, continues to decrease in consequence of the increase in age. In old age, the bulb may even become completely atrophied while the dental cavity is obliterated, in consequence of the incessant development of the bed of ivory. The fact of the continuous thickening of the ivory constitutes the first act of development inherent to the ivory-like substance. It is effected by a permanent assimilation of the particular materials elaborated by the pulp for the use of the dentine, which is penetrated, molecule by molecule, by the probable intermedium of the canaliculi.

This phenomenon, which is very active during the fœtal or follicular state of the tooth, abates from the time that the organ projects beyond the jaw, until the disappearance of the pulp cavity, and the concomitant atrophy of that organ marks the term of the existence of the tooth in the economy, and provoks its spontaneous fall.

Development of the dental canaliculi.—The canaliculi of the ivory, (pl. xii., fig. 4,) which have been already pointed out, at the moment of the origin of the dentine are subjected to considerable modifications in consequence of the phenomena of development. At the commencement of the formation of the ivory, the dental canaliculi appear in the form of wide, rounded orifices corresponding to the point where they encounter the edges of the cells. Upon parts of the ivory which are a little more advanced, these orifices open into a small and slightly flexuous canal, the length of which, as has already been stated, is in direct proportion to the thickness of the ivory bed. At the same time, the small grooves which the canaliculi exhibit at their orifices, change into conduits, in consequence of the thickening of the thin beds of ivory. They thus form one or more branches proceeding on the sides toward the neighboring canaliculi. Such is the beginning of the production of the canalicular subdivisions, and of the anastomoses of the tubes. In a series of favorable preparations, we can see the whole of the modifications which are effected from the condition of the simple lacuna on a very thin edge of ivory, to the very rich and complicated arrangement of the canaliculi in the adult.*

Thus we see the tubes proceeding regularly, nearly parallel to each other, although exhibiting many flexuosities in their course.

On the way, some small secondary tubes, of less size than the primitive trunk, detach themselves; these generally extend to the nearest canaliculus, but sometimes they reach one more removed, passing by several others that are interposed, (pl. xii., fig. 4, *c*, *d*, *e*, *f*.)

These dental canaliculi sometimes show, especially toward the external surface of the ivory, small lacunæ which are very numerous and very near together. These little lacunæ are infinitely varied in form and size, and they manifestly do not exist on the caps of dentine, which are some tenths of a millimetre in thickness and are already covered with enamel. They are produced later, and in the same manner as the secondary branches of the tubes, in consequence of an intimate mechanism of molecular reabsorption. These small, irregularly triangular or star-shaped cavities (pl. xii., fig. 4, *b*) are observed more frequently upon the course of the secondary ramifications than on that of the primitive trunks, and they also appear to be centres of radiation, the angles of which receive the terminal extremities of many canaliculi. Subsequent, as has been already stated, to the origin of the ivory, they can be observed until the adult state—

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* The dental canaliculi were discovered by Leeuwenhoek, (Observations made with the microscope upon the structure of the teeth, bones, ivory and hair. Philosophical Transactions. London, 1678, No. 140, p. 1002, quarto.) In a letter, dated 14th April, 1687, he says: "*Tubulos exiles dentem conficientes, originem suam habere in cavitate dentis, ac finire in circumferentiam usque ejusdem.*" He describes them in man, the elephant, hog, horse, and ox. (*Continuatio epistolarum*, etc. Lugduni Batavorum, 1696, 4to., vol. 1 or 11, according to the copy, pl. i., fig. 4.) He only describes the rectilinear and parallel trunks. It was not until much later, in 1835, that Purkinje described them again, as well as their ramifications, (Dans Fraënkel. *De penitiori dentium humanorum structura observationes.* Vratislaviae, 1835, quarto.) According to Henle, the canaliculi would form, almost everywhere, three great inflections in their passage from the dental cavity to the external surface: the first inflection, near the centre with the concavity turned toward the triturating surface of the tooth; the second, with the concavity directed toward the root; and the third, with the concavity turned like the first, (Henle, *loc. cit.*, p. 428.) In addition to these three large undulations, Retzius describes, in the course of the canaliculi, a large number of small curves placed in succession, and states that he had found as many as two hundred in the length of a line. He also describes the wall of the tubes, since demonstrated in various ways, and he considers them to be a particular species of vessels, containing a liquid secreted by the surface of the pulp differing at the various periods of existence, (p. 560,) and upon the dry pieces an inorganic, earthy substance soluble in weak acids, and already seen by Müller, (p. 497.) (Retzius, *Bemerkungen über den innern Bau der Zæhne, mit besonderer Rücksicht auf den im Zahnknochen vorkommenden Rœhrenbau*, Müller's *Archiv für Anat. und Physiol.* Berlin, 1835, 8vo., pp. 486–497, 508 and 560.)

their development is connected with the production of the subdivisions of the canaliculi to which they serve as means of most easy and perfect communication. There are anastomotic cavities, the multiplicity of which at a determined point may even form a real net-work through which the particular liquid which fills the canaliculi of the ivory spreads itself freely. The transmission of the liquid is effected by a phenomenon of capillarity, the compact state of the dental tissue not permitting endosmotic action.

Proper wall of the canaliculi.—Every canaliculus, in its principal trunk, its secondary branches, and its anastomotic cavities, is covered by a wall of its own, the existence of which, although often contested, is clearly revealed by an examination of sections or thin caps of dentine which have been for some time subjected to the action of a weak acid. For this purpose a cutting of thin ivory is prepared, and placed between two glass plates, in a liquid composed of equal parts of water and ordinary hydrochloric acid; it is slightly warmed above an alcohol lamp until the liberation of gas has entirely ceased. The ivory has now become soft and elastic, yet it cannot be crushed easily by compression. Thus placed between two plates of glass under the microscope, and observed through the whole extent of the decalcified mass, the tubes preserve their position, their form, and their relations. Let some drops of water be now added, and continue the heating until the commencement of ebullition in the liquid. The preparation in consequence becomes extremely pale, and the dental cartilage is entirely transformed into gelatine, which is more or less soluble in the heated liquid. The tubes, now isolated from each other, become flexuous, and twist upon themselves in every direction when the glass plates move on each other. They have become buoyant, and susceptible of being drawn away or set in motion in the liquid, at the will of the observer, by movements of pressure or by blows on the glass plate. They can in this way be completely isolated, in the shape of very slender and brilliant filaments which have the most varied inflections.

These small, blackish filaments, thus isolated in the liquefied ivory, are nothing more than the proper walls of the tubes separated from the ivory-like surface. It is certain that this proper wall is composed of an absolutely homogeneous, transparent substance containing no traces of granulations or striæ: in one word, it exhibits no traces of organization, and, consequently, neither vessels nor nervous tubes—the volume of the latter is, moreover, incompatible with the calibre of the dental canaliculi. The proper walls, isolated, are also in their course, without varicosities or enlargements other than those of the small anastomotic cavities described above, and which are seen at the terminal extremity of the secondary branches.*

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* Müller, in 1836, relying on the dark appearance of the outline of the tubes, admitted the existence of the proper wall, which was examined better afterward

If instead of applying this action of the acids to a section of adult ivory, it is employed on a part of the terminal edge of a cap of dentine in an embryo, the preparation exhibits an analogous appearance, with the difference that the tubes are infinitely shorter, and that a certain number of them have no secondary branches and terminal cavities. The tubes are hardly one-hundredth of a millimetre in length at the extreme edge of the strip of ivory; and when the elements are dissociated by crushing the preparation, small, isolated tubes, of equal size at both extremities, are seen floating in the liquid, and individually exhibit the characteristics indicated above.* It is important to notice that this isolation of the proper walls of the canaliculi can be obtained upon portions of the growing ivory, on the inner face of which the cells with tails or filaments are just rising, as well as upon adult teeth.

Connection of the cells with the canaliculi.—We have already stated that when the range of cells adhering to the lower face of the ivory, on sections of caps in process of development, is torn away, it is evident that the canaliculi of the latter correspond to the juxtaposed edges of the cells, at the level of their angles in particular, and not at the level of the angle of their *corps*. Let us add that at the inner face of the dentinal caps still covered with cells, the ends of the latter are immediately in contact with the ivory, as well toward the thinnest

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by Retzius (1837) on preparations subjected to the action of hydrochloric acid; since then by Kölliker, (*Anat. microscopique*, Leipzig, 1852, II, 2d part, p. 61, fig. 189.) Tomes, in recent researches, has demonstrated them anew, and has even attributed to them an important office in the sensibility of the ivory, particularly of the bed subjacent to the enamel, (Tomes, *On the Presence of Fibrils of soft Tissue in the Dentinal Tubes*, 1858, London.) We agree with Henle (*loc. cit.*, p. 430) that this wall, of incommensurable thickness, is composed of a slightly granulous, amorphous matter, entirely without organization. As to the fact of the extreme susceptibility of the most exterior bed of the ivory, we consider that it can be explained by the existence of such an abundant net-work of canalicular ramifications and anastomotic cavities at this point: indeed, their presence, which rarifies the fundamental substance to a considerable extent, is singularly favorable to the transmission of external impressions, and especially to the mingling of the liquids from without with the liquid which they contain, when the enamel happens to be removed.

* The examination of the dental canaliculi in preparations made both from the adult and the embryo do not leave grounds for a single doubt as to their anatomic constitution—they are composed of a tube furrowed into the ivory and covered with a proper wall; while examinations restricted to the adult have led to the belief that the filaments are the fibres of which the ivory is composed. Nasmyth, Raschkow, M. Oudet, etc. have fallen into this error. The ivory has not a fibrous structure, but is constituted by a homogeneous mass, which is traversed by the canaliculi whose development we have described, and which were considered by Retzius (*loc. cit.*, 1837) to be tubes full of liquid, and when dry, filled with solid salts disposed in small, granulous masses: tubes which, after the ivory is macerated in hydrochloric acid, appear under the form of flexible, undulated, transparent, sunken fibres.

part of the cap as at the level of the thickest central part. The tails of the cells, when they do exist, turn up against the ivory; they are bent round in the same way when their ends are in contact with the inner face of the *membrana præformativa.* It is also worthy of notice that before the appearance of the dentine, or on the other side of the thin and flexible edge of the already formed ivory, (pl. xii., fig. 2, *c*,) there are many cells with this prolongation. Upon bulbs where the dentine does not yet exist, or rather when we direct the examination to those cells beyond the edges of the cap where the ivory has not yet extended, we see only that the tails, occasionally as long or even longer than the cells to which they belong, are straight, causing a remarkable separation between the latter and the *membrana præformativa*;* they touch the latter, on the contrary, by their peripherical end, (pl. xi., fig. 1, *c′*.) In the same manner they touch the inner face of the thin and flexible edges of the growing ivory, being only some thousands of a millimetre in thickness, and the isolable canaliculi of which are also only some thousandths of a millimetre in length; it is therefore impossible to suppose that the dental canaliculi are a production of the prolongations of the cells, more especially as at this period the canaliculi can be isolated after the cells are removed by the scraper. Moreover, these canals are of equal width at both ends, and, as we have just shown, are wider and much shorter than the tails or prolongations. It is then by a phenomenon of autogenesis that the proper wall of the canaliculus is produced at the internal face of the tubular spaces which remain free at the level of the angles of the cells, particularly during their progressive ivory invasion. It is not the representative of an element which has previously existed in another form; and from the time of the appearance of the ivory it offers a resistance to the action of the chemical agents, which is not possessed by the subjacent cells.*

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* When a bulb suitably prepared with the cap of dentine which adheres to it in process of evolution is placed under the microscope, an examination of the deeper parts toward the exterior, and at the level of the thin and flexible edge of the ivory will reveal the tissues enumerated below: 1st. The tissue of the bulb. 2d. The range of the juxtaposed cells of the dentine, (called by some authors *the membrane of the ivory.*) 3d. The gradually attenuated edge of the cap of dentine. 4th. On the exterior face of the latter advances the exterior amorphous bed of the bulb, called the *membrana præformativa*—it follows it more or less distant from the side of the summit of the cap of dentine, in approaching which it disappears, and it covers the ivory by forming slight embossments or very delicate, transparent undulations on its surface. 5th. Beyond it, and contiguous to its external face, are the cells of the enamel, which are very easily detached from it, and do not adhere to it in many of the preparations. Lent is incorrect in describing and representing this *membrana præformativa* as extending over the surface of the bulb to the surface of the enamel, and not between the ivory and the cells of the enamel, and also in considering it as corresponding to the *cuticle of the enamel,* (Lent, *Ueber die Entwicklung des Zahnbeins und des Schmelzes; Zeitschrift für wissenschaftliche Zoologie.* Leipzig, 1855, 8vo., vol. vi. pp. 121–134.)

In this series of phenomena there are none which can be compared to those of the ossification of the cartilages.

By treating the thin sections of the osseous tissue in the same manner as the ivory, we can, it is true, isolate the cavities or osteoplasts, and the radiating canals which start therefrom. This proves the presence in them of a proper wall, distinct from the cavity; they are then seen floating in the liquid in their usual shape, but extremely pale. With sufficient attention, the observer can detect the presence of the peripheral canaliculi, which are extremely short. Usually, the osteoplast is surrounded with a small, and very pale gelatinous mass of a muddy appearance. These different characteristics will not, however, permit us to assign an analogy of nature between the dental canaliculi and the osteoplast with its ramifications. Not only are their forms very distinct, but the method of the development of the osseous tissue is very different from that of the ivory, and the isolation of the osteoplasts, by means of weak acids, is much more difficult; the walls are also much thinner, paler, and at the same time less resistant. The dental canaliculi, on the contrary, are isolated with the greatest facility through all the details of their flexuosities and secondary ramifications. The osteoplasts observed in these conditions contain besides, in their interior, one or more drops of pale-yellowish oil, without any trace of a nucleus properly so called. These particularities are interesting because they demonstrate the presence of the proper wall in the cavities and osseous canaliculi, but we cannot draw the conclusion of Purkinje, Schwann, Retzius, etc., that they are identical with the dental canaliculi.*

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* Schwann and many of his successors think that the fundamental substance interposed between the canaliculi is formed by ossification of the cells, and that these latter are the analogues of the medullary canals of the bone, (Schwann, *loc. cit.*, 1838, pp. 123–128;) their walls would be a production of those of the ossified cells which circumscribe them. According to Henle, the canaliculi of the teeth full of calcareous substances are analogous to the fibres of the nuclei of the arteries, and are formed by the elongation and union of the nuclei of the cells, while the calcareous secretion which forms the interposed substance takes place around them. Kölliker considers that the walls of the cells of the dentine are thickened by the calcareous secretion, and that their cavities are filled as far as the limitation of a canal, which canal becomes free and forms the dental canaliculus, as a consequence of the ends of the cells becoming united to the ends of the ones lying next to them, (1852.) Since that time, Henle has agreed with Lent in the opinion that the cells of the surface of the pulp, which are the real cells of the ivory, form a bed called the *membrane of the ivory*, (which is not the *membrana præformativa.*) The formation of the fundamental substance of the dental bone results from a secretion, which is effected either by the cells of the ivory, or by the dental pulp, and the calcareous salts are disposed in this fundamental substance: the prolongations of the cells would then be the dental canaliculi. (Lent, *loc. cit.*, vol. vi. p. 128, 1855, and not 1852 as was stated in the first note to section *a*, second paragraph, chapter III. of this work.) The prolongations of the cells of the dentine had already been observed by Nasmyth, (*Researches on the Development, Structure, and Diseases of the Teeth*, London, 2d part, 1849, 8vo., p. 104,) but he seems to have taken them for the cells of the enamel. Hannover, who has given a very exact drawing of the cells of the dentine and their prolongations, considers them to be the cells of the enamel, (*loc. cit.*, vol. xxv. 1855, p. 26, fig. 20,) although he correctly represents the cells of the enamel and the situation of their nuclei at the side of them, (fig. 17.)

RECAPITULATION OF THE PHENOMENA OF THE DEVELOPMENT OF THE CANALICULI.—When the edge of the caps of dentine is lifted, the ivory is seen, as has already been stated, growing thinner insensibly until it is not more than two or three-thousandths of a millimetre in thickness; then it ceases, and beyond we see only shreds of the substance called the *membrana præformativa.* These shreds float in the form of an extremely thin, delicate, transparent, homogeneous membrane, which is sometimes slightly striated longitudinally, and appears to blend with the edge of the ivory, (pl. xii., fig. 1, *a*,) which is so thin that it folds like a soft membrane. But the ivory is always distinguished by the presence of small tubes in the form of an orifice with a star-shaped outline, traversing it through and through so long as the dentine is still rather thick. The edge of the caps, thus detached, are often covered with a bed of the cells of the dentine of which we have spoken, and this bed, adhering to the thin, floating strips of the *membrana præformativa*, extends beyond the ivory. The cells preserve their regular juxtaposition there, and it is invariably the thin extremity which adheres either to the ivory or the membranous strips; while the largest extremity, containing the nucleus, is turned to the side of the bulb, (pl. xii., fig. 2, *c*.)

The thickness of the dental cap gradually decreases from the centre to the edges until it is only some thousandths of a millimetre, showing that the change of the cells into ivory is not effected in the whole mass at once; for the depth of the edge of the caps of dentine is not equal to the length of the cells. The cells are then gradually united to each other, and become dentified from the peripheral to the central extremity. Never, indeed, does the edge of the cap of dentine exhibit a depth equal to the length of the cells, as would be the case if the cells were calcified in beds through their whole thickness at once.

From the time that the ivory is thus generated, as far as a substance or proper dental element, it is nourished and developed, that is to say, it grows, and becomes thicker during a certain period. Consequently, it is subjected to intimate changes which, for instance, occasion in its depth the production of the ramifications of the dental canaliculi, and the constriction of their trunks, (for they are a little larger at the time of their appearance than afterward;) but the growth of each tooth considered as an organ, does not result merely from the development of the ivory as far as an anatomic element or tissue. In the other organs it is owing both to the development of the elements which have already appeared, and to the appearance, during a certain period, of new elements which join those that appear first. In a word, even before the first range of cells has been changed into dentine, another bed succeeds it at the lower face of the dentinal cap; this continues in the crown during a certain period, but stops before the eruption of the tooth from the follicle—in the root this operation is prolonged until the epoch of the completion of the radicular portion of the tooth. Indeed, the cells of the ivory are found at the lower face of the caps of dentine, when the latter are already quite thick, and are not yet united to each other in the multicuspid follicles. But this production of the cells of the dentine soon ceases, and all action in the ivory is confined to the intimate changes of molecular renovation.* This cessation is connected with the gradual correlative changes, already mentioned, which are effected in the texture of the bulb. These changes are of such a character that the bulb is soon adapted to the office of furnishing the nutritive materials of the ivory, and not such materials as serve for the genesis of the cells.†

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* Hoppe has isolated the corpuscles of the bones by treating the latter with weak hydrochloric acid, and then heating with the sand-bath and Papin's Digester. In the same way, he has isolated the proper wall of the dental canaliculi, already demonstrated by Müller, Retzius, etc. He recognizes that the fundamental azotized substance is *glutine* and not gelatine, (*Archiv für Pathologische Anatomie und Physiologie*, 1853, vol. v. pp. 178 and 185.)

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A STATED meeting of the Association was held on the evening of October 1st, 1861, at eight o'clock. Vice-President, Dr. Buckingham, in the Chair.

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* It has already been stated that in the case of such teeth as grow continually, like those of the rodents, this cessation does not occur, and the bed of the cells of the dentine is renewed throughout the whole duration of life.

† It is important to notice a fact which is connected with the continuance of the cells on the surface of the bulbs of the incisors of the rodents during the entire life—this fact is that the changes in the texture of the bulb, just referred to, do not occur in the bulb of these teeth in these animals. In the adult, the bulb still preserves a texture similar to that of the bulb of all the teeth in the embryo.

The principal business transacted was the election of the following officers for the ensuing year:—

President, Dr. T. L. Buckingham.
Vice-President, Dr. C. P. Fitch.
Secretary, Dr. George T. Barker.
Treasurer, Dr. J. Foster Flagg.
Librarian, Dr. Samuel S. White.
Committee on membership, Drs. McQuillen, Fitch, and Roberts.

A communication was received from the retiring President, Dr. Dillingham, expressive of regret at being unable to be present, and offer an address as requested at a previous meeting of the Association.

On motion, a vote of thanks was tendered to that gentleman for the impartial and satisfactory manner with which he had presided over the meetings of the Association for the past three years.

Dr. William H. Atkinson being present, was unanimously requested to present his method of using the mallet in filling teeth. Dr. Atkinson complied, and presented at some length his manner of preparing the cavities, the shape and serration of instruments employed, and the proper method of introducing the gold. His remarks were exceedingly entertaining and instructive. It is with pleasure we state that, having witnessed Dr. Atkinson fill a tooth by the malleting process, we can but in justice say that he succeeds in introducing a uniformly hard and perfect filling with less shock to the tooth than with the ordinary hand pressure; the principal objection to its use being the necessity of always requiring an assistant to use it properly.

A monthly meeting of the Association was held on the evening of October 8th, 1861, at eight o'clock.

President Buckingham in the Chair. Strangers present, Drs. Atkinson, Starke, Wood, White, Hopkins, and Lusane. Members present, Drs. McQuillen, Flagg, Roberts, S. S. White, Garretson, Fitch, Hopkins, and Barker.

On motion, the regular subject for discussion was omitted, and a unanimous request was made to Dr. William H. Atkinson to present, at this meeting, his microscopical specimens of teeth. An elegant instrument having been procured through the kindness of Dr. S. S. White, he proceeded to exhibit first a section of a canine fang, in the first stages of calcification, showing beautifully what has been termed by Czermák the lines of contour. They are thus described in Kölliker's Microscopical Anatomy, page 475, note 5:—

"Mr. James A. Salter (On certain Appearances occurring in the Dentine, dependent on its mode of Calcification, 'Quarterly Journ. of Med. Science,' vol. i. p. 252, 1853) has confirmed Czermák's results, and has added some very interesting observations of his own. He considers that the contour lines, which he prefers to call 'contour markings,' may arise from various causes, not only from those pointed out by Czermák—curvings and local enlargements of the canals and interlobular spaces, but also from a difference in density without alteration of structure; and he states as a general law, that the curves of the contour markings are in proportion to the primary curves of the dentinal tubes at any particular spot, and cross them at right angles. No markings are more divergent than the outline of the tooth, and passing from within outward, they abut in succession upon the external surface of the dentine, under the enamel and *crusta petrosa*, in the form of granular patches. The outer extremities of these patches look like white rings on the surface of the tooth. They are composed of coarse globular dentine, and gradually thin out internally into mere streaks. When a tooth is macerated in acid, it may be broken up into cones, (triangles in section,) as Dr. Sharpey first indicated, formed by the normal dentine between the contour markings. In transverse sections, the cones become, of course, rings. Finally, Mr. Salter points out that the enamel is almost always imperfect opposite the 'patches' at the outer ends of the contour lines.—Trs."

Also several sections of exostosed teeth, showing the disease in its different stages of progress, with specimens of different abnormal conditions of the human teeth, and presented to notice others selected from inferior animals. Dr. Atkinson's specimens are, we think, unexcelled by any in this country—showing that a vast amount of care has been expended in their selection, preparation, and successful mounting.

His address, which occupied most of the evening, was listened to with marked attention; and, at its close, a vote of thanks was tendered him by the Association. Exceptions were taken, however, to certain positions assumed, by different gentlemen.

After remarks by Drs. McQuillen, Buckingham, and Barker, the motion to adjourn was offered, and adopted.

A monthly meeting of the Association was held on the evening of November 12th, 1861, at eight o'clock.

President, Dr. Buckingham, in the Chair. Present, Drs. Peirce, McQuillen, Harris, Suesserott, Fitch, Roberts, Hopkins, and Barker. The subject for discussion, being

"The Preparation and Filling of Approximal Cavities in the Six Superior Anterior Teeth,"

was opened by Dr. Harris, who said such cavities were very apt to take much the same shape as the tooth, and it was necessary to obtain free access to the cavities to successfully fill them; this he secured by means of mechanical pressure, if the patient was near at hand, there being nothing to prevent the patient from repeating his visits, though he had several patients that would separate such teeth themselves, by means of gradual wedging, before they came to him; but, if it was necessary to fill immediately, would file the teeth, making a V-shaped space, the wider portion being toward the lingual surface, and would fill from that opening. This method had the advantage of preserving the external shape of the tooth, also preventing the filling from showing, which, he thought, always should be accomplished when possible. To fill such cavities, he introduces a single cylinder, or plate of gold, afterward condensing it with a pair of plugging forceps. On first using these instruments, he was not pleased with them, and threw them aside; but was induced by a lady patient to take them up again, and now considers them invaluable.

Dr. Peirce said, where the teeth were crowded it was not advisable to use wedges, as the teeth would come together, and decay would be apt to progress, and thought it requisite that a space should be left that could be readily kept clean.

Dr. McQuillen remarked, where the teeth were crowded, presenting a contracted arch, and it was necessary to fill from the lingual surface, that it was frequently very difficult to get sufficient light reflected into the cavity, particularly if the day was a dark one. This difficulty could be easily overcome, however, by placing small pieces of linen on the tongue, as they would act as reflectors to the rays of light. Such teeth cannot be filed, as they are usually very long and narrow, and are in contact only at the approximal surfaces near the cutting edges; as a general rule, he prefers wedging to filing where there is approximal decay.

Dr. Fitch said, he had recently adopted the plan of wedging advocated by Dr. Atkinson, viz., to wedge the teeth apart at the time the patient first presented, gradually driving in the wedge with the mallet.

Dr. Barker said, he could not approve of the method advocated by Dr. Harris, of filling approximal cavities uniformly with one cylinder, or plate of gold. He would take, for instance, one of the most common cavities found in such positions, commencing near the neck of the tooth, and occupying nearly the entire approximal surface down to the cutting edge; these cavities would be found quite superficial, (what might be termed spoon-shaped,) and often so sensitive as to preclude the possibility of grooving, requiring the operator to under-cut toward the neck of the tooth only. Now, he would ask, if a single cylinder could be successfully introduced in such a position? On the other hand, if pellets are used that under-cut portions at the neck can be made the retaining point for the filling, and one pellet after another being welded together, the force being applied toward the walls of the cavity, a filling is made more perfect, he believed, than in any other manner. He also thought that in the deep cavities found in such positions on approximal surfaces, that a cylinder introduced soft enough to take the shape of the cavity would, when condensed, be only hard on the surface. The small, deep cavities, occasionally seen in such positions, he believed might be filled with a single cylinder.

Dr. Fitch thought such a cavity as described by the preceding gentleman could not be filled with a cylinder. He recently met with a case where the saliva was of such an albuminous character as to destroy effectually the adhesive properties of the gold, as the breath would seem to coat the filling with a thin, slimy crust, therefore could fill with nothing but cylinders of gold. Where cylinders are used, the weak points are always at the angles, and these should be filled with pellets.

Dr. Harris said, if a man can introduce a gold filling in less time than with pellets, it was an advantage; and thought none should condemn the method unless they had practiced it. He did not believe that pellets could be so welded together, but that when a filling was removed each one could readily be separated from the other; indeed, had tried the experiment with a filling introduced by the late Dr. Townsend. The cavity should be so shaped that the cylinder can be introduced with facility, the gold having been rolled as hard as possible before inserting it.

Dr. McQuillen stated his objections to cylinders, and gave his reasons for preferring pellets. He knew that gold could be packed so hard with pellets that it could be rolled out into plate through the mills.

Dr. Buckingham believed that more gold could be introduced into a cavity with pellets than in any other method. The difficulty in cylinder fillings is, that the force is diminished as you proceed from the foundation, being spent only on the surface. Dr. Townsend was in the habit of frequently using a plate of gold or flattened cylinder in the cavities that were close to or beneath the gum, allowing it to extend beyond the cavity, thus preventing the secretions at the neck of the tooth from passing down on the filling; also using it as his foundation on which to build with pellets; this method he adopted, and found it exceedingly useful. He did not think gold could be packed as perfectly as solid gold, but it could be so condensed that, after annealing, it could be passed through the mills and rolled into plate. The fillings on approximal surfaces he seldom allowed to touch, preferring to have a space between; wedges with India-rubber, and uses, in place of a common file or chisel, a file shaped like an ordinary flat burnisher.

Dr. Suesserott advocated the preservation of the natural shape of the teeth, and makes use of pluggers, in the cavities under consideration, having a lateral curve, thus doing away with the use of the file.

Dr. Barker advocated the gradual wedging of teeth, preferring to use cotton or orange-wood for that purpose. The objection to filing a space between the anterior teeth wider toward the lingual than the labial surface was, that the tongue would, in the articulation of many words, induce a hissing, unpleasant sound, though fortunately this did not occur in all cases.

Dr. Peirce would ask Dr. Harris if he considered there was no danger of cracking a tooth by using plugging forceps?

Dr. Harris replied, great care was necessary; and he also made it a point to support the tooth with the fingers of the disengaged hand.

On motion, the subject of

"CAUSES AND TREATMENT OF DISCOLORED TEETH"

was chosen for next discussion.

PENNSYLVANIA COLLEGE OF DENTAL SURGEONS.

BY GEO. T. BARKER, D.D.S.

The regular course of lectures in this institution commenced on Monday, the 4th day of November, 1861, there being in attendance nearly if not quite as large a number of students as at any previous session, the matriculating list presenting, at that early day, the names of thirty-three gentlemen gathered from different sections of our own, as well as several from foreign countries.*

The introductory to the course was delivered by Prof. C. N. Peirce, in the presence of the class and several practitioners of this city; and we present, with pleasure, the following synopsis of his remarks. He said:—

Gentlemen of the Class:—

The ever-changing seasons have again brought you to this institution to prosecute the study of dentistry. It is my privilege to welcome you here to-day, on behalf of the Faculty, and in the name of our advancing profession.

The poet has said, weep not that the world changes; did it keep a staple, changeless course it were cause to weep. All is revolution, all change; no death—day follows night, and night the dying day; stars rise and set and rise, and all on earth follows the example. "Often, in the progress of the world, there have become periods when old usages have been discarded; when society, in its upward tread upon the ascending steps of civilization, has perceived that certain time-honored opinions and customs were false and unnatural; wise men, through past centuries, had maintained that the earth was the fixed centre around which circled the starry hosts of heaven; they had the testimony of their own eyes—and seeing is believing; and when Galileo, looking from a higher point of vision, beheld the earth in motion, his announcement was answered by prison and torture." Even when Harvey, but little more than two hundred years ago, proclaimed the circulation of the blood, his contemporaries at first received with scorn this new-fashioned doctrine; for was this man wiser than Hippocrates and Galen, and all the old fathers of medicine? But the blood coursed on through its myriad channels nevertheless. A sage poet, not many years since, gravely enunciated the long-sanctioned theory, that

"Just experience shows in every soil
That those who think should govern those who toil;"

but while the occupants of a portion of our soil have been complacently humming over this couplet, hard-handed, clear-headed men wisely and patriotically exercised their right of suffrage, and through continents was reiterated the electric words, "all men are created equal," and "governments derive their just powers from the consent of the governed." Notwithstanding that conservatism of our nature which shrinks from what seems to be innovation, and which makes us rather bear those ills we have than fly from old customs to the new and untried, the world stands not still—the irresistible tendency is onward; and though we may, to-day, be engaged in a strife for the protection of liberty and self-government against a band of men whose uncontrolled passions, instigated by the love of power, have induced them to strike a blow for the supremacy of slavery, I say, notwithstanding this is our national condition at present, I trust the day is not far distant when right will be uppermost, and peace and prosperity will reign in our now unhappy country.

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* We understand the class at present numbers forty-four students.

From a hasty glance at the signs of advancement in the various professions, none seem more worthy of note, or greater, proportionately, than those in our own specialty. In looking back but little over a century we find that dentistry, as a profession, was embraced by only a few, and that probably the great mass of the people were born and died without ever receiving advantage from an educated practitioner. For the alleviation of pain resulting from imperfect dentures, recourse was had to the practicing physician and the barber and blacksmith, the former for constitutional, and the latter for local and surgical treatment. But in later times, as education and refinement among the masses have been advancing, the demand for dental operations became more apparent, and with this came the demand for private instructors; and, superficial as this system of instruction was, the student was still more embarrassed by various pledges, both as to secrecy in the art, and location, and time of practice; the fee for instruction always being large, and proportionately so as the time of pupilage was shortened, varying from one to six months. But as the light of civilization grew brighter, the demand for educated dentists became more evident, till, finally, the propriety of attaching a chair of dentistry to the medical schools was really suggested, at the risk of incurring the indignation of that mighty profession; yes, my friends, it was even thought that dentistry, being too weak to support itself, must be rocked in the cradle of medicine, and fed from the pap of a medical school. But the world moved, the light grew broader, and there came another demand. The idea took possession of many noble minds, that the profession was not complete, nor could it be made so without the addition of another element. The necessity for a distinct and separate school, with a division of the branches to be taught, and ample arrangements for a clinic, where the student would not only be afforded the opportunity, but required to perform a certain number of practical operations, was needed. This necessity has now brought into existence four dental schools, devoted exclusively to the dental profession, three of which have been in operation for a number of years.

Let me congratulate you, gentlemen, as I have ofttimes congratulated myself, that at the time at which we enter the profession, many of the obstacles to progress have been removed, and the path is comparatively smooth. But think not the end for which you strive is to be gained without exertion on your part. You must enter upon the study of dentistry with determination and patience, and with the conviction that you are within your own legitimate and appropriate sphere, with the capabilities and adaptations of your nature, such as to make the study agreeable, and insure advantage to your patients as well as success to yourselves.

Remember that industry, from the beginning of time, has been a wise ordination for man; that by and through it whatever is most beneficent, permanent, and glorious in the development of art, science, trade, commerce, and social intercourse, has been achieved. Human strength, guided by intellect in the various departments of toil, is the nearest approximation to the All-creative power of which we can conceive. To every one self-sacrifice and endurance bring their due reward; comfort and independence abide with those who can control their desires, and wait while the fruit ripens which their toil has planted. We find in every branch of business, whether mechanical or professional, men reaping the full fruition of their labor. If we trace out their early history we shall see that the foundation for their successful achievements was laid early in life, before age had clouded their understanding, or years of toil disturbed the vigor of manhood. They began life, as all have to do, without experience as a guide, but they carried with them the habits of industry, application, and perseverance of their pupilage. These enabled them to overcome obstacles, and gradually raise themselves to a height far above that reached by earlier competitors, whose genius gave greater promise. No idea is more fatal to the student than an over-estimate of his natural ability, a belief that earth's highest honors can be acquired by some royal road. Let him remember that the intellectual man who prefers the fascinating scenes of the ball-room to the quiet of his study, or the exhilarating influence of the wine-cup to the more lasting inhalations from the never-failing fount of science, or who chooses the luxury of musing to the labor of deep, earnest thought, will have to bear the humiliation of a waning fame; while others, who have been more faithful, are casting a light upon the world, which grows brighter and brighter, until, having attained its zenith, is added to those stars in the intellectual firmament which pale not as time passes, but serve as beacons for others' guidance.

Prof. Peirce, after referring to the importance of diligent study, and strict punctuality in attendance upon lectures, said:—

You will find that the study of chemistry, with its attractions and repulsions, affinities and antipathies, and the invisible laws that govern these changes, covers such a wide field of observation and research that it will be impossible for your teacher, on that branch, to give you more than a fractional part; hence it devolves upon him to examine, collect, and condense such parts and such only as are essential to our specialty.

The same also is true of the study of anatomy and physiology—the former with its wonderful revelations of design and adaptation, the latter with the functions and the conditions under which they are normally performed; while with the professor of the principles of surgery and therapeutics there is subject without limit, requiring the greatest care to thoroughly examine and collect from the various authors, selecting the good and adding to it knowledge derived from observation and experience, all of which in each particular branch must be digested and arranged so as to be best adapted for your instruction. This labor your teachers perform with pleasure, and it remains for you, by being always attentive, to make it comparatively easy; but if, on the contrary, inattention or indifference should pervade the class, our efforts will be more or less irksome, and in vain. We of the Faculty desire to do all within our power to facilitate your studies, and promote your welfare, and we rely confidently upon your kindness and generous co-operation to make our labors pleasant and successful.

In addition to your duties in the lecture-room, of which I have spoken, I wish to call your attention to those in the clinic, embracing the operative and mechanical departments. Of the conveniences and facilities for improvement offered you in these rooms I need not speak, for I know that you will appreciate them as you progress in your studies. But on your scrupulous observance of the rules laid down for your government while receiving instruction from the demonstrators, I wish particularly to call your attention. For punctuality in your engagements, and the utmost care in all your operations you will see the necessity; while upon your conduct toward the great variety of patients constantly coming and going, either before, after, or during the operations, will much depend the good and evil report of our school. The rapidity with which you progress or become proficient in the operative and mechanical branches depends much upon your deportment in the clinic. Here you are offered the facility for a practical application of what is taught you on those branches in the lecture-room, from the preparation of a material for an impression, to the completion of the teeth, and their adaptation to the mouth, or from tempering the point of the most delicate excavator or plugger, to successfully completing the most difficult manipulations performed with such instruments.

Here, also, in addition to such instructions, will you have the opportunity once a week of seeing operations performed by members of the Faculty. The advantage of the clinic and instructions there received, in preparing the student for his calling, cannot well be over-estimated; the variety and number of patients, and hence of operations there performed, gives him an experience greatly superior to that gained by many years spent in a private office. I have thus briefly drawn your attention to the importance of the clinic, but I do not ask that you should devote yourselves to it at the expense of the lectures, but that deserving, it should receive a proportionate share of your regard and attention. Every operation that the public could demand of an efficient practitioner, make yourselves practically familiar with—mere theoretical knowledge is not sufficient; if the task be difficult or unpleasant, pursue it until repetition make it otherwise. To do this may require application and exertion on your part, but remember that activity is a universal law of nature, that it is the only road to a high and honorable career.

Having thus briefly, gentlemen, indicated to you a few thoughts which I deemed essential to your professional advancement, let me, in conclusion, draw your attention to one other of equal importance—it is the observance of the laws of health. The old and familiar adage that "all work and no play makes Jack a dull boy," is as true of the workingman of the present day as it was of Jack; hence I would dissuade you from the idea that the good student must necessarily either burn midnight oil or deprive himself of healthful exercise. An over-taxed brain is as incapable of working advantageously as an over-taxed muscle, and one equally with the other requires a variety of exercise, and the invigorating influence of pure, fresh air. The fatigue and languor consequent upon attendance in the clinic and lecture-room during the day, and which so unfits one for study in the evening, can always be greatly relieved by a brisk walk of a few squares in the fresh air, or, for those who are fond of gymnastics, a half hour spent in one of our gymnasiums would afford healthy exercise for the body, and pleasant relief and diversion for the mind; either of these would be preferable to the billiard-saloon, card-table, or theatre. Not that I think these cannot be indulged in without injury, but that they are not the kind of recreation the student needs, for while the excitement unfits the mind for study, the body is enervated by the inhalation of an impure atmosphere.

With these few remarks, gentlemen, I cordially welcome you to our institution, and with pleasure and pride can I assure you that no pains will be spared to make your sojourn with us as profitable and pleasant as circumstances will allow.

The remarks of Professor Peirce were listened to with the utmost attention, and at their close were warmly applauded.

EDITORIAL.

ARSENIC.

My experience in the use of this substance, in treating teeth, has been over twenty-three years, and in that time I have had as much opportunity of experimenting with it as any one in the profession, and perhaps I have done more with it than any one, simply because when teeth are tender I do not tax the *nerve* of my patient to a very great degree in bearing pain. I have frequently spoken on the use of it before, but not in precisely the same way that I wish to at present. What I say I alone am responsible for, still I hope that no one will push the use of it until he learns all that is known about it out of the books; then, perhaps, with a careful use of it, with close observation, he may learn to do great good with it; but if any one attempts to follow up its use without knowing all about it, as well as the idiosyncrasies of different patients and their peculiar temperaments, he had better let it alone. I am aware that persons totally disqualified in these respects have attempted to use it, and have met with trouble and have abandoned and condemned it as a bad and injurious substance in dental practice. Ignorant operators must use simple remedies, or, as a matter of course, they will meet with bad consequences.

Many years ago I had an example of this kind in a young friend whom I taught *how* to use it, but he knew nothing, or comparatively nothing, about it or the nature of his patients, and, after getting into trouble with it, he abandoned it for a time; but, as he remarked himself, after he learned more about it, he took it up again and was successful with it. This will always be so with routinists, or those who follow manipulations and not principles in practice. Men of limited capacity and knowledge may learn to make separate portions of a steam engine but know nothing of the principles of engineering. But the question is simply reduced to this: is it better to use it as an auxiliary in dental practice, as far as the good of the patient is concerned, or not? We answer that it is. Some say that if employed to destroy sensitive dentine, it will permeate to the pulp and inflame or destroy it. This is all true; and if a narcotic is used all the time to alleviate pain in a patient, when such remedy is required, it will kill. There is no argument in this; all medicines are poisons, or they would be of no use. Getting into such trouble is always the result of ignorance or a lack of judgment in the case under treatment, or a false diagnosis.

I always use arsenic with caution until I learn how it will suit the patient, as it acts upon him according to his peculiar impressibilities to it, and this differs so much in different individuals and in families, that it requires an operator to *feel* his way rather than to expect all cases to fall in with his manner of manipulating with it.

As to whether it is a proper system of practice for a dentist to palliate sensitive dentine, I will leave to the judgment of other operators and their own feelings, with regard to inflicting, to my judgment, unnecessary pain on their patients. If patients are satisfied to bear the pain, who know no better, I have nothing to say or complain of; if they learn better and leave their dentists, it is their loss—so it seems. J. D. W.

(To be continued.)

DENTISTS IN THE ARMY AND NAVY OF THE UNITED STATES.

This subject, which has time and again found ardent advocates among dental writers, appears to receive less attention at present, when there is greater need for dentists in the service of the country than at any previous period.

Fully recognizing, when this matter was first agitated, the importance of the movement and the advantage that would accrue to those who should enjoy the advantage of first-class professional services, we yet, however much in opposition to our wishes, had then, and still have, very great doubts of the movement meeting with encouragement and sanction from the general government. Particularly when the daily expenditure of the government for the support of the united service amounts, according to the estimate of reliable journalists, to $1,500,000, it is not in the least degree probable that the secretaries of the army and navy will recommend to Congress the propriety of establishing an entirely new department, which will be attended by a very large additional outlay per annum.

Admitting that the propriety of such appointments should be recognized, difficulties, no doubt, would arise with regard to furnishing the materials, gold-foil, plate, teeth, etc., demanded in the performance of dental operations. The government would not be likely to supply them, the dentist, of course, could not be expected with a limited salary to do so. And the men, officers excepted, receiving but $12 per month, a large proportion of which must go toward the support of those dependent on their exertions, would hardly be in a condition to make a sufficient return for skill, material, and time expended in such operations. Again, the difficulties attendant upon the performance of such operations during the prosecution of a vigorous campaign, particularly in the winter time, regiments moving from one point to another, here to-day and there to-morrow, the absence of suitable places to operate in, must prove serious drawbacks.

Each and all of these influences would be calculated to reduce the operations of the dentist simply to the treatment of exposed nerve pulps, alveolar abscesses, and the extraction of teeth—operations which the *thoroughly* educated surgeon should be prepared to meet. The education of the surgeon, however, in this direction, it must be admitted, has not heretofore been sufficiently attended to, and it is extremely doubtful whether one out of ten can diagnose between an aching and sound tooth, an exposed pulp and acute periostitis, the course of treatment demanded in each case, or, when extraction is demanded, perform that operation as it should be done. Indeed, it is difficult to conceive how it could be otherwise in the latter operation, as the surgeon is only provided, by a regulation of the service, with two pair of forceps, one straight and one curved. With these he is expected to meet every emergency that may arise.

In giving utterance to such opinions, it is not our wish to be regarded as desiring to cast reproach upon the gentlemen engaged in the service of the country as surgeons. Far from it. Many of those so employed were among those intimate associates whose abilities and attainments commanded our respect, when prosecuting the study of medicine, and in pressing the views above, it is merely placing on record sentiments which they have given utterance to, or admitted in familiar conversation, after years of experience gained at home and abroad.

The fault is not with the surgeon but with his education, and some plan should be adopted by the medical bureaus of the army and navy so that this may be remedied.

It is gratifying to notice that the demand for surgeons and assistant-surgeons in the army has induced several gentlemen, heretofore engaged in the practice of dentistry, to tender their services as surgeons, and they have been accepted as such. Among these are Dr. John McGrath, of this city, Dr. Wm. M. Wright, of Pittsburg, and Prof. Joseph Richardson, of Cincinnati. Having enjoyed the advantage of a thorough medical education, we feel satisfied that they will prove themselves equal to every emergency in their new field of operations, and trust that they may be, to some extent, instrumental in effecting a practical reformation in the direction indicated by this communication. J. H. M'Q.

REVIEWS.

Owing to the peculiar changes wrought in every department of life by the distracted condition of the country, we are, for the first time since this magazine started into existence, unable to present to our readers extracts from contemporaneous journals. Only one of these has come to hand during the past month, and as this has only two articles in the original department, each of which have already been presented to the profession in the columns of other magazines, but one alternative was left, and that was to bide our time and make up for the deficiency in subsequent numbers. In accounting for the non-appearance of the other journals, although no public announcement has been made of the fact, positive information has reached us that the *American Journal of Dental Science* has closed its existence. More than a year has elapsed since the reception of the last number. The same may be inferred with regard to the *American Dental Review*, a still longer period having elapsed since the last number of that magazine came to hand. The *Dental Review* of London, and the *British Journal of Dental Science* are, owing to negligence on the part of the publishers or some other cause, as usual considerably behind the time when they were due. J. H. M'Q.

TO PREVENT STONES USED FOR SHARPENING INSTRUMENTS FROM CLOGGING.

In a recent letter from a friend and correspondent, Dr. W. Muir Rodgers, he remarks:—

"Is it a fact generally known that a saturated solution of supercarbonate of soda answers a very good purpose to keep Arkansas stones from clogging? I use it daily upon the stone with which I sharpen my instruments, and like it better than anything I have tried. I also use it upon the slips for polishing fillings. Excuse me for mentioning so small a matter, with which you are no doubt long since familiar. It occurred to my mind as I was about to close, and may possibly be worth a trial."

Although we have never used the supercarbonate of soda as recommended by Dr. Rodgers, there can be no question that this suggestion will be found quite useful by those who try it. Sweet oil, the article generally employed to obviate the clogging of the different kind of stones used for sharpening instruments, is very objectionable on account of the liability of soiling the fingers and different articles that it may be brought in contact with. On this account we have used Castile soap in place of oil for a number of years. The soap is applied in a thick lather, and when the edge of the instrument is passed over the stone it comes in contact with as clear and keen a surface as that presented when oil is used. The soap may be allowed to dry, and then is made ready for use in a moment by a drop of water. The argument in favor of this material is, that there is little or no liability of soiling anything with it, and it is self-cleansing.

J. H. M'Q.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

British Journal of Dental Science—August.

Practice of Hardening and Tempering Steel.—(Concluded from page 211.)—"When in the fire the steel becomes altogether expanded, and in the water its outer crust is suddenly arrested, but with a tendency to contract from the loss of heat, which cannot so rapidly occur at the central part; it may be, therefore, presumed that the inner bulk continues to contract after the outer crust is fixed, and which tends to tear the two asunder, the more especially if there be any defective part in the steel itself. An external flake, of greater or less extent, not unfrequently shells off in hardening; and it often happens that works remain unbroken for hours after removal from the water, but eventually give way and crack with a loud report, from the rigid, unequal tension produced by the violence of the process of hardening.

"The contiguity of thick and thin parts is also highly dangerous, as they can neither receive nor yield up heat, in the same times; the mischief is sometimes lessened by binding pieces of metal around the thin parts with wire, to save them from the action of the cooling medium. Sharp, angular notches are also fertile sources of mischief, and, where practicable, they should be rejected in favor of curved lines.

"As regards both cracks and distortions, it may, perhaps, be generally said that their avoidance depends principally upon *manipulation, or the successful management of every step:* first, the original manufacture of the steel, its being forged and wrought, so that it may be equally condensed on all sides with the hammer, otherwise, when the cohesion of the mass is lessened from its becoming red hot, it recovers in part from any unequal state of density in which it may have been placed.

"While red hot, it is also in its weakest condition; it is therefore prone to injury, either from incautious handling with the tongs, or from meeting the sudden cooling action irregularly, and, therefore, it is generally best to plunge works vertically, as all parts are then exposed to equal circumstances, and less disturbance is risked than when the objects are immersed obliquely or sideways into the water; although, for swords, and objects of similar form, it is found the best to dip them exactly as in making a vertical downward cut with a sabre, which, for this weapon, is its strongest direction.

"Occasionally objects are clamped between stubborn pieces of metal, as soft iron or copper, during their passage through the fire and water. Such plans can be seldom adopted, and are rarely followed, the success of the process being mostly allowed to depend exclusively upon good general management.*

"*In all cases* the thick, unequal scale left from the forge should be ground off before hardening, in order to expose a clean metallic surface, otherwise the cooling medium cannot produce its due and equal effect throughout the instrument. The edges also should be left thick, that they may not be burned in the fire: thus it will frequently happen that the extreme end or edge of a tool is inferior in quality to the part within, and that the instrument is much better after it has been a few times ground; in urging this point, I cannot do better than quote the couplet inserted in Moxon's 'Mechanic Exercises,' and which he describes as having been very old and familiar to smiths even in his day—

"'He that will a good Edge win,
Must Forge thick and Grind thin.'

"Thirdly, the heat for tempering or letting down. Between the extreme conditions of hard and soft steel there are many intermediate grades, the common index for which is the oxidation of the brightened surface, and it is quite sufficient for practice. These tints, and their respective approximate temperatures, were tabulated by Mr. Stodart.

	Degrees.	
1. Very pale straw yellow	430	Tools for metal.
2. A shade of darker yellow	450	
3. Darker straw yellow	470	Tools for wood and screw taps, etc.
4. Still darker straw yellow	490	
5. A brown yellow	500	Hatchets, chipping chisels, and other percussive tools, saws, etc.
6. A yellow, tinged slightly with purple	520	
7. Light purple	530	

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* Mr. Jordan informs me that in making the magnets for Fox's dipping needles, which are about ten inches long, one-fourth of an inch wide, and the two-hundredth part of an inch thick, this precaution entirely failed; and the needles assumed all sorts of distortions when released from between the stiff bars within which they were hardened. The plan was eventually abandoned, and the magnets were heated in the ordinary way within an iron tube, and were set straight with the hammer after being let down to a deep orange or brown color. Steel, however, is in the best condition for the formation of good permanent magnets when perfectly hard.

8. Dark purple	550	Springs.
9. Dark blue	570	
10. Paler blue	590	Too soft for the above purposes.
11. Still paler blue	610	
12. Still paler blue, with a tinge of green	630	

"The first tint arrives at about 430° F., but it is only seen by comparison with a piece of steel not heated: the tempering colors differ slightly with the various qualities of steel.*

"The heat for tempering being moderate, it is often supplied by the part of the tool not requiring to be hardened, and which is not therefore cooled in the water. The workman first hastily tries with a file whether the work is hard; he then partially brightens it at a few parts with a piece of grindstone or an emery stick, that he may be enabled to watch for the required color; which attained, the work is usually cooled in any convenient manner, lest the body of the tool should continue to supply heat. But when, on the contrary, the color does not otherwise appear, partial recurrence is had to the mode in which the work was heated, as the flame of the candle, or the surface of the clear fire, applied, if possible, a little below the part where the color is to be observed, that it may not be soiled by the smoke.

"A very convenient and general manner of tempering small objects is to heat to redness a few inches of the end of a flat bar of iron, about two feet long; it is laid across the anvil, or fixed by its cold extremity in the vice; and the work is placed on that part of its surface which is found by trial to be of the suitable temperature, by gradually sliding the work toward the heated extremity. In this manner many tools may be tempered at once, those at the hot part being pushed off into a vessel of water or oil, as they severally show the required color; but it requires dexterity and quickness in thus managing many pieces.

"Vessels containing oil or fusible alloys carefully heated to the required temperatures have also been used, and I shall have to describe a method called '*blazing off*,' resorted to for many articles, such as springs and saws, by heating them over the naked fire until the oil, wax, or composition in which they have been hardened ignites; this can only occur when they respectively reach their boiling temperatures, and are evaporated in the gaseous form.

"The period of letting down the works is also commonly chosen for correcting, by means of the hammer, those distortions which so commonly occur in hardening; this is done upon the anvil, either with the thin pane of an ordinary hammer, or else with a *hack-hammer*, a tool terminating at each end in an obtuse chisel edge which requires continual repair on the grindstone.

"The blows are given on the hollow side of the work, and at right angles to the length of the curve; they elongate the concave side, and gradually restore it to a plane surface, when the blows are distributed consistently with the positions of the erroneous parts. The hack-hammer unavoidably injures the surface of the work, but the blows should not be violent, as they are then also more prone to break the work, the liability to which is materially lessened when it is kept at or near the tempering heat, and the edge of the hack-hammer is slightly rounded."

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* The knife edges, for Captain Kater's experimental pendulum, were very carefully hardened and tempered in a bath heated to 430 degrees; being then found too soft, they were rehardened, and tempered, at only the heat of boiling water, after which they were considered admirably suited to their purpose.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Lecture on Dentition and its Derangements. By A. JACOBI, M.D., Prof. of Infantile Pathology and Therapeutics, New York Medical College and Charity Hospital. "*The Diseases of the Mouth, and their Relation to Dentition; Stomatitis, and its different Forms; Glossitis; Parotitis; Differential Diagnosis in Relation to Etiology; Treatment without regard to Dentition; Muguet.*—No part of the infantile organism is more exposed to injurious influences than the mucous membrane of the mouth, nor is there any which is more frequently observed to suffer. Traumatic injuries are not frequent, except those sometimes produced by sharp margins of teeth irregularly shaped; the more frequent affections are those resulting either from chemical influences, or from an excessive degree of temperature. The mucous membrane of the mouth is very irritable, being accustomed only to amniotic liquor in fœtal life, and to milk in the early stage of extra-uterine existence. Every change in the diet, therefore, the bad quality of the maternal or artificial nipples, the use of candy, sucking bags, or alcoholic beverages, coffee, or stimulants of whatever kind, will act as irritants, producing hyperæmia or inflammation in a more or less severe form. It is by no means common to observe very severe forms of stomatitis after all such preceding causes; on the contrary, the large majority of cases, including those depending on primary acute catarrh of the stomach, and the raising of a large quantity of gastric acid, so frequent in infantile age, are very mild. Nor are some of the most severe forms of stomatitis in adults often found in early age. Thus it is a peculiar fact that the influence of the external and internal use of mercury has little influence on the mucous membrane of the mouth, or the salivary glands, in infantile life. Whatever the consequences of the administration of mercurial preparations may be, salivation, or even a mild form of erythematous stomatitis, is seldom observed; in a large number of adult patients there will perhaps none be found who will not suffer from a certain amount of mercury, but of infants, and children of even more advanced age, those who show mercurial symptoms are exceptions to the rule.

"There are a number of indirect influences also observed to produce the common or erythematous form of stomatitis. It will often be seen in dependence on or in connection with traumatic injuries of the face, erysipelas, and hyperæmia and inflammation of the pharynx. It is further seen under the influence of many dyscrasic processes, as it is a very common symptom attending scarlatina, variola, morbilli, syphilis, and typhoid fever. It is frequently, as its causes will often continue or return, or be replaced by others, of long duration and obstinacy, like the pharyngeal hyperæmia and swelling in adults, and very generally proves a serious difficulty, although unattended by severe fever or deep-seated anatomical disorganization of any particular organ. Injection, swelling, high temperature, and slightly reddened color of the mucous membrane, copious or suppressed secretion, and pain on being touched, are the usual symptoms of the common form of erythematous stomatitis.

"A more severe form is that known by the name of aphthous stomatitis. The superficial layers of the epithelium are not thrown off during the hyperæmic swelling of the mucous membrane, as in erythematous stomatitis, but a real and visible change takes place in the anatomical structure of the follicles. There is a circumscribed, punctated, vascular injection around a follicle, which is gradually infiltrated by exudation. The consecutive swelling increases in proportion, the follicles will burst and exhibit a superficial erosion, or ulceration, and the adjacent mucous membrane will be sympathetically affected. Some of these cases, which are by no means very frequent, look very much like the vesicles of labial herpes, with the only exception that they are less accumulated on a certain small locality; some may be explained by mechanical injuries, some cannot be explained at all. If it was not for those cases occurring in the first two months of life, so well described by Beduar, aphthous inflammation of the mouth would be a very rare disease; at all events, the first stage will seldom come under observation, and usually the second stage, in which the vesicles are fully developed, is brought unto your notice.

"That dentition, that is, the protrusion of teeth through the gums, can have nothing to do with this form of stomatitis, is manifest from the fact that it occurs mostly in the earliest period where teeth protrude in but very rare and exceptional cases; and that, whenever it is seen in advanced age, no connection, either casual or as to time, can be found between the two. Much less can be said of all the forms of inflammation of the tongue known to be the consequences of caustic substances, combustion, or the poisonous stings of insects; this parenchymatous glossitis has not even been supposed by the most ardent advocates of the universal danger of dentition to be the result of its influence. Nor are the most severe forms of disease of the mouth attributed to dentition, like noma, or scurvy, or diphtheritic inflammation. They are, like the usual forms of stomacace, in which fibrinous exudations are deposed into the superficial layers of the mucous membrane, with an immediate tendency to gangrenous decomposition, well known to be not only the result of a local affection, but more so of a general decomposition of the blood. They are to be considered as the local symptoms of a general disease, the former being entirely subordinate; to say nothing of the age in which they occur by preference. Diphtheritic inflammation will occur in any age, but mostly between the first and third, at all events rarely before and during the protrusion of the first incisors; scurvy, noma, and stomacace are mostly seen in a somewhat advanced age, between the fourth and tenth years of life. In these, the local affection is something; but the larger amount of the symptoms and of danger depends on the general character of the disease.

"There is another form of disease, on which nearly the same remarks may be made. Inflammation of the parotid gland, both idiopathic and symptomatic, is not a very uncommon disease, except in the age of dentition. Idiopathic parotitis will usually occur as an epidemic disease, in a similar manner as diseases of the larynx, or pneumonia, will appear as an epidemic, from some causes not perfectly understood, but depending on season and the constitution of the atmosphere; this idiopathic form is seldom seen both in the first year of life and in senile age. The symptomatic form, which will usually terminate in suppuration, and is observed in certain epidemics of typhoid fever, cholera, septicohæmia, and in some of variola, measles, dysentery, and pneumonia, is very rarely observed in small children; and therefore, among the causes of the above-named diseases, dentition is out of the question, with the exception, perhaps, of an occasional case of slight swelling of the parotid gland, brought on by the contiguity of the mucous membrane. I certainly do not deny the possibility of erythematous stomatitis occurring during the protrusion through abnormal gums, of perhaps an abnormal tooth, in an abnormal direction, and in an abnormally irritable child—one or more of these conditions being together, and therefore admit that a mild parotitis may sometimes occur in a causal connection with dentition; but what I deny, and have attempted to prove by the illustration of the physiological process of dentition, is this, that diseases depending on this process are not the rules, but the exceptions. At all events, not even the slightest erythematous stomatitis must be permitted to go on the plea of dentition, unless there is a local hyperæmia of the gums, the seat of the supposed cause of disease, corresponding with the more general affection. I lay the more stress on this, as I believe I have shown, by the numerous causes of stomatitis exhibited to you, that we need not be at a loss to find a cause in any given case, if we are competent to form a differential diagnosis. As long as there is certainty, we had better not resort to hypothesis or conjecture.

"If a large number of cases of stomatitis was the result of dentition, why is it that a uniform mode of treatment, if any is resorted to, has not been accepted in these cases, relating to and dependent on this cause? And why is it, that if any uniform treatment has been accepted, and is recommendable, it is just such as has no connection whatever with dentition? And why further is it, that having no regard whatever to either teeth or gums, it is so uniformly successful? I speak of the chlorates of both potassa and soda, the effect of which in all these cases can no longer be doubted. It has long been a matter of difficulty after it had been largely introduced into practice, since the times of Hunt, West, Isambert, and others, to decide whether the effect was local or general. But the experiments of Gamberini and Semmola show that the local effect of chlorate of potassa in mercurial stomatitis is very little, if any; but that the same remedy administered in sugar-coated pills, had a satisfactory effect. My own experience has led me to the same conviction, although, if any local effect is produced, it could be done by the chlorate being transmitted into and secreted by the saliva.

"Another of those diseases often enumerated among the consequences of dentition is that sometimes called membranous stomatitis, now better known by the French name of 'muguet.'

"Muguet is an affection which a few facts will prove to have not the slightest connection with dentition. It has been generally observed in new-born infants, or in those but a few weeks old, but it is occasionally met with in more advanced life, even in adults suffering from exhausting and fatal diseases, toward the close of life. It is known by the occurrence of whitish or grayish cream or cheese-like deposits, of variable sizes, on the mucous membrane of the upper part of the digestive tract; they will be found on the lips, tongue, cheeks, pharynx, even in the larynx and œsophagus, but never in the stomach. One of its prominent symptoms, as described by adults, is a burning pain in the mouth, corresponding with the local affection; that infants suffer in a similar manner, is proved by their crying on being touched, and by their unwillingness to take the breast or swallow. Where no deposits happen to be seen, the mucous membrane appears injected, dry, and smooth, and but little mucus and saliva is secreted. In perhaps every case diarrhœa has been observed; so regularly, indeed, that Vallaix speaks of diarrhœa as one of the common and almost pathognomonic symptoms of muguet. It is, however, probable that its cause is to be sought for in the impaired digestion, want of mastication, absence of saliva, and affection of the mucous membrane generally.

"The enumeration of a number of symptoms does not explain the nature of a morbid process, or a pathological deposit; and nothing but a description of the pultaceous deposits on the mucous membrane will illustrate the morbid change taking place in the mouth. They consist of the mucus of the lining membranes, of old and new epithelial cells, of fat globules, particles of food more or less decomposed, and, finally, of microscopical fungous growths of different size, with sharp outlines and indentations, from which equally composed thalli will originate, to such a number sometimes as to form a net-work of dendritic parasitic tissue. The fungus was discovered by Robin, and called *oïdium albicans*, and has been described by Laycock, Gubler, and a host of other medical writers. It is not known in any form differing from that found in the mouth, and it is probable that it is, as such, contained in the air, and deposited at the entrance of the digestive organs; at least no other opportunity for its occurrence on the mucous membrane of the mouth is possible. It may be transmitted by the atmosphere, or transplanted from one individual to another by direct contact, by the use of the same spoon, etc. But it will not always develop itself with the same readiness, certain conditions being required. They depend on an acid condition of the mucous secretion of the mouth, a certain dryness and injection of the mucous membrane, feebleness of mastication, and easy access of air. It is important to observe, that the secretion (as far as it is kept up) of the mucous membrane of the mouth is acid instead of alkaline. It is very frequently found in infants whose mouths are not kept so clean as they ought to be, who are accustomed to sleep while, or immediately after, taking the breast, and retaining milk in their mouth, which soon is decomposed and acidified. Muguet is therefore often found in foundling hospitals, where the inmates receive but little care, and uncleanliness is almost the general rule. Where proper cleanliness is strictly enforced no muguet will appear, because no parasitic fungus is allowed to settle and form a crust of pultaceous matter. Thus pure water is both the best prophylactic and curative agent; the only thing worth adding is a small quantity of alkaline substance, chlorate of potassa or soda, carbonate of potassa or soda, biborate of soda, or chloride of sodium. The mouth of every infant ought to be washed out after each meal, to be certain that no deposit remains on the mucous membrane. Where such has been the case, the local treatment alluded to is perfectly sufficient. The deposit is found in the superficial layers of the epithelium; it seldom reaches the deeper ones, and scarcely ever implicates the lining membrane itself. Thus cleanliness will remove the affection; the surface sometimes bleeds when the deposit is rubbed off. The addition of sugar, rose-honey, or syrup, to the water, (or weak alkaline solution,) must be strictly avoided; these substances will adhere to the lining membrane and themselves undergo decomposition, and prove a source of new difficulties.

"The occurrence of muguet, then, is a mere accident, and has no intrinsic connection either with a distinct morbid process or with any certain period of early infantile development. It is no more characteristic of any constitutional disease, or general condition of the system, than tinea favosa on any part of the surface, which may be communicated from either man or animal, or scabies. You readily perceive that there is no shadow of a reason to search for any connecting link between the formation and protrusion of teeth and the accidental peculiar deposit on the mucous membrane of the mouth, called muguet, which years ago could be taken for a special kind of exudative stomatitis, but is now well understood."—(*Amer. Med. Times.*)

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"*The Antrum of Highmore and its Diseases.* By JAS. E. GARRETSON, M.D., of Philadelphia.—A purulent condition of the secretions of the antrum may be viewed somewhat as one would view a gonorrhœa, or an ozena; indeed, Mr. Bell, the English author, goes so far as to describe the conditions as being similar. 'Both diseases,' he says, 'consisting equally of an altered secretion; in the one, of the pituitary membrane, and in the other of the muscular lining of the urethra, which, in neither instance, possesses any of the characteristics of abscess, though the matter in both is purulent.'

"Certainly, if we allow for some differences, as influenced by cause and location, the description of the one would very well answer as the description of the other. In both we have the same perverted secretion, the same molecular change, the same sthenic and asthenic modifications.

"As a gonorrhœal discharge is always preceded by certain inflammatory conditions, and, as after the subsidence of the acute attack, the discharge may long continue profuse, or, on the contrary, may decline to a scarcely perceptible minimum; so, in antral purulency, must we have the associated inflammation, and we may have the profuse or limited secretion.

"In antral diseases, however, as may be readily inferred, very much depends on the nature and associations of the secretion. A profuse discharge, with closure of the orifice of the cavity, must necessarily entail the most untoward consequences; the walls of the cavity will attenuate until (unless surgically relieved) the weakest point will give way, the rupture being most apt to occur either within the orbit or the mouth Not unfrequently, however, this weakest portion seems to be the canine fossa, and the opening has occurred at the tuberosity. My own experience, however, would lead to the inference that the hard palate is, by far, the most common point at which the matter seeks egress. You will see a tumor bulging out from one side of the mesial line, and which advances more or less rapidly, until fluctuation becomes very distinct. A sign diagnostic of this class of tumors, as I have had occasion to observe, is, that its internal boundary is apt to be quite abrupt, and does not pass the line midway to the mesial division. The establishment of a fistula relieves it at once of the sense of distention, and if it has formed in a convenient place, as within the mouth, the patient may feel disposed to congratulate himself on having come to a sufficient cure. Unfortunately, however, in the majority of cases, this satisfaction is of short continuance; for, independent of the fact that the disease at once takes on the chronic form, making the sufferer an object of disgust to those with whom he is brought into immediate contact, the fetor of the discharge, under some circumstances, being really unbearable. Yet, also, is the undue retention of the secretion within the cavity such a source of irritation to the parts that, not unfrequently, the most serious lesions result. In some instances, the whole of the bones of the face being destroyed.

"The causes influencing retention of these secretions are twofold:

First, the external wound is apt to heal, and to continue impervious until an increase of the secretion induces sufficient pressure to cause its absorption, as in any case of abscess. In the second place, the passage is blocked up by flocculi within the cavity.

"Puruloid secretion in the antrum may, from the onset, be of so limited a character that—like secretions in certain of the ovarian cysts—years may pass before marked inconvenience results. I am acquainted with a case, that of Mr. C., late an eminent merchant of this city, in whom, after five years of great mental and physical suffering, a disease of the antrum, supposed to be malignant, was found to be nothing but simple muco-puruloid engorgement depending upon a dead tooth. In this case the trouble had commenced with a feeling of heaviness and oppression in the body of the jaw; the parts had gradually enlarged until there was a distention of the cheek to the size of a large fist, the eye being finally thrown entirely out of position from the rising of the roof of the antrum. Much treatment had been given the case without the slightest accruing benefit. No attention, however, had been directed to the dental arch—the teeth, although the patient was sixty years of age, being apparently in the most perfect condition.

"The result of this case was the diagnosis, on the part of a surgeon to whom he finally applied, of a dead nerve in one of the bicuspid teeth; the organ, although as healthy looking as any of its fellows, responded to the stroke of an instrument in the manner as described in the paper on alveolar abscess; this tooth was extracted, and in six months the patient was perfectly restored.

"A circumstance connected with the extraction of the tooth in this case offers an example of practice in this direction, of which it is well not to lose sight. The practitioner who related to me the circumstances of the case, informed me that he expected to find associated with the tooth fang a pyogenic membrane, and to have the extraction followed by a gush of pus, in both of which, however, he was disappointed. The fang was clean, and the blood which followed the operation had nothing peculiar about it. Not to be thus balked, he passed a probe up the alveolus of the extracted tooth, which, meeting a resisting, yet yielding body, he pushed through in the direction of the antrum, and into which cavity, with some little effort, it was made to pass; the withdrawal was followed by a profuse purulent discharge. This resisting body may be simply flocculi, as alluded to, or it may be the mucous membrane proper to the parts—most likely it would be found the latter, for we are to remember that it is not alveolar or antral abscess with which, in these cases, we are dealing, but simply what might be termed a mucitis, and, of course, a break in the continuity of the membrane is not necessarily to be looked for. The practitioner, in this case, only approximated to the exact condition; he thought, evidently, that the trouble was tooth abscess discharging itself into the sinus, whereas, (while the treatment was perfectly adapted to the requirements,) yet the case was one of simple mucous, or muco-puruloid engorgement, the result of reflected irritation.

"The diagnosis of mucoid and puruloid engorgement of the antrum is, as a rule, not difficult to make out. At first there is inflammation, and this, as suggested, is most likely to have an origin about the teeth; symptoms of catarrhal trouble in the Schneiderian membrane present, the result of its continuity with the affected parts, more or less mucous, or it may be puruloid matter is passed from the nares of the affected side. This, as the trouble advances, ceases, and the patient begins to complain of a sense of heaviness about the body of the cheek. If the secretion is active there will be much pain, sometimes sharp in character, but more frequently heavy and unbearably dull. In all chronic periodontal inflammation we have this same dull pain, but then it differs from the pain of engorgement in being confined to the alveolar arch; in this latter trouble the greatest pain is found, I think, associated with the floor of the orbit, which, as will be remembered, makes the roof of the antrum. At length, as the secretions accumulate, the parietes of the cavity begin to attenuate and expand. The tumor now forming may be distinguished from others—firstly, by the history of the case; secondly, by dryness of the nares of the affected side, the result of the closure of the orifice of the antrum; thirdly, by the gradual and regular enlargement; fourthly, by the non-association of the integuments of the cheek; and, fifthly, by the fluctuation which it will finally yield.

"To treat successfully such a trouble, we have only to search out the source of offense, and, where it is possible, remove it. If this should prove to be a tooth, we may secondarily treat the antrum through the alveolus. Where the trouble is thus of strictly local origin, we shall find that we need to do very little more than to employ daily some stimulating injection: diluted tincture of iodine is a favorite with me. Where the acrid character of the retained secretion has provoked degenerating ulcers, I have obtained the very happiest effects from weak injections of chloride of zinc.

"If, on the contrary, such bad conditions of the antrum be associated with constitutional causes, I need not suggest that such causes must have our attention. In these latter cases, however, where the cure promises to be tardy, we may give to a patient complete relief, locally, by making an opening into the antrum, and keeping it patulous by means of a cotton tent; this, combined with the daily employment of such injections as may seem indicated, will be found to yield most decided benefit.

"Concerning abscess proper of the antrum, I think it may be set down as the rarest of rare diseases. Bell and Bordenhave each mention a case. I have never met with an instance. Abscesses, described so frequently as occurring in this cavity, will, I think, commonly be found to have their origin in the alveolar border, and if treated as any ordinary case of alveolar abscess will at once succumb."—(*Med. and Surg. Reporter.*)

"*Nutrition of Bones.*—Mr. Cl. Bernard presents to the Academy of Medicine, in the name of Mr. Alphonse Milne-Edwards, the exposition of some experiments on the nutrition of bones.

"Since the beautiful experiments of Chossat, we know that animals require, for the continuance of their life, to inject every day into their stomach, besides alimentary substances properly so called, a certain quantity of mineral matter. This skillful experimenter proved that if this quantity of mineral matters come to fail, the bones become thin and fragile, and the animal dies after a shorter or longer time. How does this destruction of the osseous tissue take place? Is it by resorption of the calcareous matter or by the entire disappearance of this tissue, cartilaginous matter, and animal matter at the same time? This question, which Chossat did not try to solve by chemical analysis, Mr. Alphonse Milne-Edwards, son of the eminent Professor and President of the Academy of Sciences, has just endeavored to answer.

"For that he had only to deprive for some time an animal of calcareous salts, then to find out by chemical analysis whether, under the influence of this diet, the bone had become poorer in inorganic matter, or whether its volume alone had diminished without any change in the relation of the elements to each other.

"Mr. O. Milne-Edwards experimented on pigeons which he fed on wheat, rice, Indian-corn, and decorticated millet-seed. At the end of three months of this diet, these animals were taken with diarrhœa, and began to fail. The volume of their bones was much smaller than usual, they had lost about one-third of their weight. As to their composition, it had never changed, although they had been deprived of calcareous salts; hence we must conclude that it is not only the earthy matter which has been abstracted, but that there has been a resorption of the osseous tissue itself. These experiments confirm the opinion, that the osseous tissue is the result of a chemical combination of the organic matter with the phosphate of lime."—(Dr. Deslandes, *Amer. Med. Times.*)

"*On the Elimination of Mercury from the System.*—Dr. Schneider has recently made some researches on the elimination of mercury during and after a mercurial treatment, which have given the following results: During the internal administration of such preparations, the electrolytic examination of the urine shows always traces of mercury; but the quantities are so small that the amount of urine discharged within twenty-four hours is often not sufficient for a satisfactory result, and the metal must be searched for in the whole of the urine discharged within three to six days. Traces of mercury were also found in the urine of a patient who had not taken it internally, but had been treated with mercurial ointment. The elimination of the drug by the urine lasts for some time after the mercurial treatment has been discontinued. In the first week afterward it is invariably found, and in two cases it was even discovered in the fourth and the sixth week afterward. After six weeks Dr. Schneider has never succeeded in discovering traces of mercury by electrolysis. The elimination of it is not promoted by the administration of iodide of potassium, as the quantity of mercury contained in the urine was not at all increased, but rather diminished, when that drug was given; and if it was taken a few months after the end of the mercurial treatment, mercury did not reappear in the system, probably because nothing was left behind. One patient who had suffered from syphilis for five years, and had been three times treated with mercury, (the last time very energetically, having used twenty drachms of ointment, equivalent to more than 120 grains of mercury,) died of pericarditis two months after the third course, and Dr. Schneider could, therefore, search for mercury in the internal organs. The result was that the bones, the brain, and the spleen, which are generally believed to retain mercury for years, did not contain a trace of it, while the kidney showed an infinitesimal quantity of the metal, the result of the examination of the liver being doubtful. It is, therefore, evident that mercury entirely disappears from the system, a short time after the end of treatment, and cannot, therefore, cause secondary syphilitic symptoms; nor can it be eliminated from the system years after the treatment by Dr. Caplin's electro-chemical baths. In two cases of hydrargyrosis considerable quantities of mercury were discovered in the urine, and in one of them, which ended fatally, also in the internal organs, especially in the liver. Urine which contains mercury does not necessarily contain albumen also; but in the two last-mentioned cases of hydrargyrosis there was albumen in the urine.

The saliva which is collected during a mercurial treatment does not contain any mercury. The quantity of mercury which is eliminated after the end of the treatment amounts to about one-fourth of that actually administered."—(*Vienna Correspondent of the Med. Times and Gazette.*)

The Sensory and Motor Functions of Nerves.—In the April number of the *Natural History Review*, MR. G. H. LEWES discusses the questions, whether there is a similarity in structure and a difference in function of the nerves, or a diversity in both structure and function? and reasons in favor of the former. The following extract will afford a general outline of his views: "If there is any difference between sensory and motor nerves, it is not a difference of kind, but of use. Each nerve is *capable* of serving either function, provided it be properly distributed. If nerves are distributed through the substance of muscles, they will be motor—if distributed through glands, they will be secretory—if distributed to the surfaces, they will be sensory. There will probably be little objection raised to this statement. But we must go farther, and ask whether the skin-nerve is ever motor, and whether the muscle-nerve is ever sensory? To answer this, we must first settle one or two points of physiology and anatomy. A nerve is sensory because it stimulates the Sensibility of its Centre, and not because its termination is in the skin. It is not the nerve which is sensitive, but the centre. Stimuli, which reach the nerve through the skin, affect the centre. It is to the centre, therefore, that we must look. So much for physiology; now for anatomy. 'There is no difference,' says Dr. Todd, 'between a motor and sensory nerve as regards structure. We can attribute the difference of endowment of the fibres to *no other cause but to the nature of their peripheral and central connections. The same nervous force is propagated by the fibres of each kind;* but whether that force is to excite motion or sensation, must depend on the connection of the fibres, with muscles in the one case, and with the centre of sensation in the other. The principle here laid down is irreversible; but it is an error to suppose that only *one* of the nerves is in connection with the centre of sensation.' I pointed out the fact, which had been universally disregarded, that the anterior (motor) roots were quite as unmistakably in anatomical connection with the ganglionic substance of the spinal cord, as the posterior roots were; and the conclusion seemed irresistible, that if one nerve in connection with a centre will stimulate the activity of that centre, another nerve precisely analogous in structure, and endowed with an analogous property, (propagating the same nervous force,) if *also* in connection with that centre, must *also* stimulate its activity. Modern microscopic researches have rendered the direct connection of the anterior roots with the ganglionic substance a fact beyond dispute. To resist the conclusion I have drawn, it will be necessary to prove: 1st. That the ganglionic substance with which the anterior roots is connected has not the same property as the ganglionic substance of the posterior roots; or, 2d, that nerves are only capable of stimulating in one direction. But it has been proved by Schiff that there is no difference between the properties of the anterior and posterior horns. And it has also been proved that nerves conduct in both ways.

"If, therefore, Sensibility is the property of Nerve-centres awakened by the stimulus of Neurility—if both nerves are in direct anatomical connection with their centres—and if there be not two different kinds of neurility, acting in very different ways upon the centre—there is no alternative but to accept the conclusion that both nerves have a sensory function.

"In vindicating the *essential similarity* of the two sets of nerves, we are not overlooking their *specific diversity*. The functions of various nerves, that is to say, the uses they serve in the mechanism, depend upon their anatomical connections. A nerve that is not distributed to a muscle cannot be expected to have a *motor* function; a nerve that is not distributed to a gland cannot be expected to have a *secretory* function; a nerve that is not distributed to an organ of sense cannot be expected to have a function of special sensation."

"*Pressure in the Treatment of Cleft Palate.*—I am not aware that the subject of using pressure in treating fissure of the palate has been before suggested. I am inclined to think that it has not; for when the plan first presented itself to my mind in 1851, I carefully examined French, German, English, and American works to see whether it had. I was first led to try it on the dead body of a child, which had died three weeks after birth. The fissure was longitudinal, and large enough to admit the extremity of the little finger; fissure of the lip also existed. By means of a pair of clamps, the sides of the fissure were brought readily in contact, without any fracture or displacement of the bones; the only fault was that the gums of the upper jaw were within those of the lower; but Nature would modify this as the living child grew up; the use of pressure on the lower jaw would remove a great deal of this deformity; of course the amount of deformity would depend on the size of the fissure in the palate. I several times repeated the experiments on young dogs, removing a piece of the palate bone by means of Hey's saw, and then applying the pressure. The animals did well.

"The operation should be performed as early as possible after birth, when the bones are in their softest condition. The following is the plan which I would suggest: The edges of the fissure having been pared, the superior maxillary bones should be embraced by a horseshoe-shaped clamp, with a shelf on its lower border to receive the gums and prevent it slipping. It should be padded with India-rubber or some other material to prevent the germs of the teeth being injured. The clamp should work on a joint, and possess arms. It may be said to resemble a large pair of pincers with horseshoe-shaped blades. A screw may be attached at the extremities of the handles, for the purpose of bringing the blades in contact, or the hands may be used: the former would be, I think, preferable, as the force could be applied gradually, and not be likely to be carried too far. It may also be employed in grown-up children, when the bones are so widely separated as to render it difficult to get soft parts enough to close the opening, but in a gradual manner and at intervals, more or less prolonged, according to the amount of pain it excites. If it were used suddenly it might produce inflammation, and subsequently abscess, which would prove troublesome to treat. From the foregoing it will be, I hope, understood that the younger the child the safer the operation is likely to prove, and that even in grown-up children it may be adopted, with precaution, with decided benefit.

"The pads and the ledge to rest the teeth upon should be made to slide in the sides of the clamp; the former, that the pressure may be directed on any part of the bones; the latter, that the edges of the teeth may rest on it, without the pressure being directed either too high or too low, but at the point where the palate bone joins the superior maxillary." —(*Australian Medical Record*, and *Dublin Med. Press.*)

Report on the Alleged Deaths from the Inhalation of Sulphuric Ether.—The following are the conclusions of the committee appointed by the Boston Society for Medical Improvement to investigate this subject. The whole report, which was adopted by the society, is published in the *Boston Med. and Surg. Jour.* of Oct. 24th. It is highly favorable to the safety of sulphuric ether as an anæsthetic, and in this and some other respects differs materially, we believe, from the convictions of the profession. Notwithstanding this favorable opinion, however, great care should always be taken in the employment of this as well as all other agents for anæsthetic purposes, for in the nature of things the induction of a state of general insensibility by extraneous influences, must necessarily be always attended with more or less danger to health and life.

"1st. The ultimate effects of all anæsthetics show that they are depressing agents. This is indicated both by their symptoms and by the results of experiments. No anæsthetic should therefore be used carelessly, nor can it be administered without risk by an incompetent person.

"2d. It is now widely conceded, both in this country and in Europe, that sulphuric ether is safer than any other anæsthetic, and this conviction is gradually gaining ground.

"3d. Proper precautions being taken, sulphuric ether will produce entire insensibility in all cases, and no anæsthetic requires so few precautions in its use.

"4th. There is no recorded case of death, known to the committee, attributed to sulphuric ether, which cannot be explained on some other ground equally plausible, or in which, if it were possible to repeat the experiment, insensibility could not have been produced and death avoided. This cannot be said of chloroform.

"5th. In view of all these facts, the use of ether in armies, to the extent which its bulk will permit, ought to be obligatory, at least in a moral point of view.

"6th. The advantages of chloroform are exclusively those of convenience. Its dangers are not averted by its admixture with sulphuric ether in any proportions. The combination of these two agents cannot be too strongly denounced as a treacherous and dangerous compound. Chloric ether, being a solution of chloroform in alcohol, merits the same condemnation.

"Dr. C. T. Jackson, one of the committee, objects and excepts to the clause in this report in which 'all mixtures of ether and chloroform' are denounced, viz., to the words 'the dangers of chloroform are not averted by admixture with sulphuric ether,' and to the terms 'treacherous and dangerous compound' of ether and chloroform. He believes that a mixture of four measures of ether and one measure of chloroform may be employed without danger, or with very little danger, and that the risks from chloroform are diminished more than four-fifths by this combination. He believes it to be necessary to have an anæsthetic agent of less bulk than ether, and not so dangerous as chloroform, for army uses, and is satisfied that this mixture, which he has employed and prescribed, completely answers the purpose required."

"*Nose bitten off, and sewn on again; Teeth knocked out, and reintroduced; Adjustment of a piece of detached Scalp.*—In the *Lancet* for 24th August last, Dr. Nichols recorded a successful instance of readjustment of a nose that had been accidentally separated. His communication was followed by others from Dr. Cory, (p. 216,) Mr. Horton, (p. 262,) Mr. Francis Mason, and Mr. John Jones, of Ilfracombe, (p. 239,) detailing instances of conservation of the finger, (four instances,) teeth, and nose, that had been detached. We now add three other cases, forwarded by Mr. Slayter, the late house-surgeon to the Westminster Hospital. The record of these various cases ought to convince surgeons that no chance should be thrown away of trying to save small portions of the body which have become detached. The importance of this practice is well seen by the success which has attended it.

"A woman came to the hospital in May last, about five o'clock P.M., and stated that she had had her nose bitten off by another woman about an hour previously. She brought the piece with her; it was quite black, and covered with dirt. However, Mr. Slayter washed it in warm water, and carefully sewed it on again with silver wire. In a fortnight it was perfectly attached, and had been adjusted with such accuracy that one could scarcely tell she had ever lost her nose.

"A man entered the hospital in March last, and stated that he had had three of his teeth knocked out in a fight. On examining his mouth, it was found that he had lost his three upper incisors, which he brought with him. Mr. Slayter tied them in with silver wire, and in ten days two were quite tight; the other would not stop in.

"In April last a man came to the hospital and showed Mr. Slayter a piece of his own scalp, about the size of a five-shilling piece, which he stated had been knocked off by a quart pot in a fight. It was sewn on, and in less than a fortnight it was perfectly united."—(*Lancet.*)

"*Magnetic Electricity and Gold Amalgamation.*—In amalgamating the gold of crushed quartz, it is said that a considerable quantity of the very finely subdivided particles are floated off without ever being brought into contact with the quicksilver. To make amalgamation with such fine gold dust practicable, magnetic electricity has lately been applied in San Francisco. The current of electricity is generated in a magneto-electro machine driven by the steam engine which operates the crushers, and the current is sent through the mercury in the amalgamating trough. It is stated in our California exchanges, that the current of magnetic electricity increases the affinity of the mercury for the gold, and enables it to take up a larger quantity of it from the washings of the quartz."—(*Sci. Amer.*)

Empiricism.—The following anecdote, related by the Paris correspondent of the *Lancet*, (*Med. Critic and Psychological Jour.*,) strikingly exhibits the disposition which so generally prevails, even among the most intelligent, to resort to empirical practices in the treatment of disease rather than to the true method indicated by scientific induction through accurate observation, correct reasoning, enlightened judgment, and sound philosophy. "The late M. Ferrus, on one occasion being a guest along with sundry literary and scientific celebrities at the house of Alibert, and the conversation having fallen upon the trades and professions of France, asserted that of all professions medicine was undoubtedly that which was most followed, not only in Paris, but in all countries. Every one dissented, and Alibert foremost of all. 'Why,' said he, 'there are not a thousand doctors in Paris, and some villages in the provinces have no doctors at all.' Ferrus, apparently silenced by the overwhelming majority against him, ended by saying that he was sure that the company would ere long find that he was right. In the course of the evening, throwing himself into an arm-chair, and burying his face in a handkerchief, he began to groan most piteously. In an instant he was surrounded by the whole party, who sympathizingly inquired the cause of his distress. 'A violent toothache,' was the answer. 'Go home, and gargle with warm milk,' said one; 'Put a little cotton-wool steeped in laudanum into your ear,' said another; a third recommended a poultice of boiled figs; a fourth a stockingful of hot sand; a fifth (and this no less a person than Humboldt) the repetition of some charming couplet which Brazier had just sung; and so on until each of the company had recommended some infallible recipe. When the last of the panaceas was exhausted, Ferrus, throwing away his handkerchief, and desisting from his grimaces of feigned agony, burst into a hearty laugh, saying, 'Well, was I not right? You are all doctors, and have each furnished me with a prescription. In France no one believes in medicine, and yet each one is a physician. Will you still venture to deny that my assertion was correct?'"

Progress of Science.—The following interesting observations upon this subject are given in the *Dublin Medical Press* as an extract "from an Introductory Address, delivered at the Metropolitan School of Dental Surgery, by Dr. B. W. Richardson. The lecturer said:—

"'He might congratulate them, for never in the history of science, or in the history of mankind, could any young man enter into any scientific pursuit under such happy auspices as at the present moment. Science never stood in a greater or more triumphant phase than at this hour. During the past two years the hearts of philosophers had beat at the wonders which had been brought to light by recent researches. There was an instrument, a mere piece of glass—a prism—about which there was a history which would form the basis of novels in after-years. That instrument had unveiled things never thought of or seen before by mortal eye. From its production of the prismatic colors had been rightly inferred the manner in which the rainbow was produced. For many years the instrument had remained a toy; but lately, Fraunhofer, a German philosopher, had discovered in the spectrum produced by it from the sun's rays a series of dark lines called Fraunhofer's lines. Sir David Brewster had discovered that a peculiar light could be produced if the rays of light passing through the prism had first to traverse certain gases. Then, more recently, Professor Bunsen, of Heidelburg, had found that if, into the flame of a lamp employed to produce a spectrum, the slightest portion of any metal or other element was introduced, there then would be different lines struck across the prism, having a different color or characteristic for every element. The ten-millionth part of chloride of sodium could be detected by this means. This great discovery, which was qualitative but not quantitative, was called spectrum analysis. Applying this mode of analysis, Kirschof had discovered in the atmosphere of the sun the same metals as in the earth. Recent researches also in connection with spectrum analysis had determined almost to demonstration that, throughout the whole universe, there was diffused an etherial medium which chemists could not touch, and that the heat which we felt was nothing more than the motion of this body. In this way common flame was shown to be exactly analogous to the heat of the sun. Another great advance within the last year was the discovery of Professor Graham, which he called "liquid analysis." Still more wonderful was the great advance made in our knowledge of disease by the synthetical method of research. Up to the present time all that had been done in the study of disease was to collect a great number of diseased conditions, subject them to analysis, examine what remedies would be good in such a case, or to examine what were the conditions of the body in the course of that disease and after it. That method called analysis had no doubt done a great deal of good. But now they took an animal which they knew was susceptible of a specific disease, subjected it to certain conditions likely to produce some particular disease, and from the live animal they deduced absolutely the disease. Thus they produced diabetes in the dog. In another animal they would produce epilepsy; in another animal cataract; in another rheumatic fever, with disease of the heart, and all other incident diseases. This was an absolute fact in the domain of medicine, and it would progress until all diseases were producible by human means, and consequently avertible by human prudence. They had lately made great progress with regard to the knowledge of life, and he doubted not that the physical or material part of the problem of life was close on its solution, though as regarded the intelligential part there was a great gulf fixed over which no man had glanced. From this short retrospect of what was doing in the world of science they would see that they were entering on the study of their profession under the happiest auspices.' "

"*Salivation without the Administration of Mercury.* Under the care of Mr. Bryant, Guy's Hospital.—Ann M., aged forty, a healthy woman, applied with profuse salivation. She had been first seized with the symptoms one week previously, having come on with 'a rush of water to her mouth.' Subsequently, swelling of all the salivary glands appeared, with profuse discharge of saliva; and ulceration of the gums followed.

"When seen, the fetor generally accompanying mercurial medicine was strongly marked; the gums and tongue were swollen and ulcerated; saliva flowed freely from the mouth, which was half opened, and the whole of the salivary glands appeared swollen and tender. No medicine had been taken before the attack, and her occupation was that of a housewife.

"Mr. Bryant ordered her five grains of the chlorate of potash, to be taken three times a day in infusion of gentian; and a lotion of the same salt, of the strength of two drachms to a pint of water, to be employed.

"The following week the symptoms had disappeared, and she became convalescent."—(*Lancet.*)

"*Simple Ulceration of the Tongue caused by a Sharp Tooth.* Under the care of Mr. Bryant, Guy's Hospital.—Alice J., aged fifty-three, applied for advice with an indurated circular ulcer on the left side of the tongue, of two months' growth. She was a healthy woman, and no glandular swelling existed. The ulcer looked very indolent, and had a hard base; but the edges were not so everted as is seen in cancerous sores. There was a decayed tooth at the spot, with a sharp front, which appeared to irritate. Mr. Bryant regarding this as a simple sore mouth irritated by a tooth, ordered the sharp point of the latter to be filed down, and chlorate of potash to be taken internally, and also applied as a lotion. On the third day the ulcer began to heal, and in a week it was well."—(*Ibid.*)

MISCELLANY.

In the course of a very interesting paper in the *Natural History Review*, on "Recent Geologico-Archæological Researches in Denmark," MR. JOHN LUBBOCK refers to "the absence of human remains," and thinks it "satisfactorily proves that the primitive population of the North were free from the practice of cannibalism. On the other hand, the tumuli have supplied us with numerous skeletons of this period. The skulls are very round, and in many respects resemble those of the Laps, but have a more projecting ridge over the eye; in this respect nearly approaching the skull found by Dr. Schaffhausen, and figured by Mr. Busk in our second number. One curious peculiarity was, that their front teeth did not overlap as ours do, but met one another, as do those of the Greenlanders at the present day. This evidently indicates a peculiar manner of eating."

The same writer alludes to the preponderance of lower jaw and other hard bones in fossil remains, and their relative value in palæontological investigations. He quotes the following in relation thereto, from a paper on some of the fossils found in Swanage by Dr. Falconer, who says: "'The curious fact that only lower jaws should have turned up among the Stonesfield mammalian remains, has often been the subject of speculation or remark. The same, to a certain extent, has held good with the remains found in the Purbeck beds. * * * In these minute creatures, unless the bone be complete, and, supposing it to be a long bone, with both its articular surfaces perfect, it is almost hopeless, or at any rate very discouraging, to attempt to make out the creature that yielded it; whereas the smallest fragment of a jaw, with a minute tooth in it, speaks volumes of evidence at the first glance. This I believe to be one great reason why we hear so much of jaw remains, and so little of other bones.'"

The Bonn correspondent of the *Medical Times and Gazette* states that at a recent meeting of the Society of the Lower Rhine, Professor Rusch read a paper on glandular sarcomato of the neck, which gave rise to a discussion on "the possibility of curing such tumors by other than operative proceedings. Professor C. O. Weber related a case in which a glandular sarcoma below the lower jaw, of the size of a fist, in a young man had become entirely atrophied by the persevering use of cod-liver oil internally, and ointment of iodide of potassium with iodine externally, although the tumor pressed so strongly upon the superior laryngeal nerve that the patient was completely hoarse, and at times could only whisper, and a further growth of the tumor would evidently soon have caused death. It is just these tumors in which fatty degeneration very frequently occurs, this being the only chance for the patient's safety. It is greatly to be regretted that we are not yet able to bring about fatty degeneration *ad libitum* with any degree of certainty."

In some remarks in the *Lancet*, on the efficacy of the seton in promoting suppuration and resolution of chronic inflammation of the bursæ of the knee-joint, MR. F. C. SKEY thus speaks of its advantages in the treatment of ranula: "The same agent, and on the same principle, is equally applicable to *ranula*. Indeed, it is quite remarkable with what rapidity this disease recedes under the action of the thread, whether the cyst be of average or of the largest size. Of the latter I have reported some, and treated several of such magnitude as to require the lower end of the thread to be brought out in the neck at some distance below the base of the jaw."

In a long and interesting letter upon the subject, the Berlin correspondent of the *Med. Times and Gaz.* (Sept. 7th) gives the following general account of the results of some investigations on the osteoplastic resection of the upper jaw: "This operation consists in separating the upper jaw from its connection with other bones, and again restoring it to its normal position. An operation of a similar kind was first done by Professor Langenbeck, two years ago, when he extirpated a naso-pharyngeal polypus; in that case he excised the nasal bone and the nasal process of the upper jaw, removed the tumor, and afterward replaced the bones, with complete success. Another case in which the whole half of the upper jaw was first excised and then replaced, occurred in the practice of this distinguished surgeon a few weeks ago."

In a note to a paper "On the Gold of Nova Scotia," in the *Amer. Jour. Sci. and Arts*, O. C. **Marsh** relates the following anecdote in illustration of the great pecuniary loss which may be sometimes incurred by the want of a little knowledge of science: "While at Lunenburg I was informed of a circumstance connected with the discovery of the gold which illustrates the utility of even a little scientific knowledge, and the need of its more general diffusion. Some years since a farmer, living in the neighboring town of Chester, thought he had discovered a valuable copper mine on his land, and at a great expense sunk a shaft about eighty feet in depth. Finding little copper to repay his labor, and having exhausted all his means, the work was finally abandoned. In his excavations he had cut through a large quartz vein richly stored with gold, which he had noticed, but supposed to be merely copper pyrites. The present owner works this copper mine for gold."

In the course of a learned and elaborate article on "Waterglass," (*Ibid.*,) J. M. **Ordway** observes that, "according to Wagner, the double silicate of potash and soda, which melts more readily than simple silicate, forms a good substitute for borax in brazing and in welding. He rather injudiciously recommends the mixed materials instead of the ready formed glass."

According to the *Polyt. Notizblatt* and *Chem. News*, incrustation on the mouth and stoppers of bottles containing caustic in solution, may be prevented by coating them with paraffine, which perfectly lubricates the surfaces in contact and is not acted upon by caustic alkali.

The *Chem. News* states that M. A. **Prenslan**, of Liverpool, has patented the "oil of paper for the relief and cure of toothache." He applies it "to the cavity of the tooth either by itself or upon cotton wool as a vehicle. The preparation is procured by submitting to destructive distillation in a close vessel any kind of paper made from a vegetable fibre. This curiosity, 'oil of paper,' may perhaps owe any efficacy it possesses to the creosote among other tarry products resulting from its mode of formation. If the tuft of cotton wool were itself half consumed by fire before the remaining portion be applied to the tooth, perhaps equally beneficial results might follow."

M. H. **Rose** gives, in the *Chem. News*, the following directions to separate mercury and silver: "Add a sufficient quantity of hydrochloric acid to the diluted solution. After the deposition of chloride of silver, decant the supernatant liquid; then heat the chloride precipitate with a small quantity of nitric acid, add some water and a few drops of hydrochloric acid, and then filter. Precipitate the mercury from the filtered liquid by phosphorous acid."

THE

DENTAL COSMOS.

NEW SERIES.

VOL. III. PHILADELPHIA, JANUARY, 1862. No. 6.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

We would again call attention to the central-cavity plate, for obtaining atmospheric pressure, for securing artificial dentures in their places in the mouth. We have read a great many articles on the *theory* of atmospheric pressure with relation to things *out* of the mouth as well as *in* it, but confess openly that we never comprehended the full value of it in the mouth for dental purposes, until we became acquainted with the inventor of the "*Gilbert Central Cavity Plate.*" We published an article in the November number of this journal, with relation to one of a kind of cases which we regarded as new, where there were no teeth to fasten bands, and the lower teeth were cutting the uppers away—it is a most delightful and perfect success. The central cavity in this case runs rather close to the base of the alveolar border. The whole drawing is the natural size, and the cavity not more than half a line in depth. Now while this case is successful, it does not follow that the same kind of cavity would be successful in every kind of case. This plate does not *rock* much in attempting to chew, as the under teeth strike against the plate all round, immediately behind the front teeth, as well as inside of the bicuspids. But not so with a plate we inserted for a gentleman about the same time. On it there were only one bicuspid on the left side, and the second bicuspid and two molars on the right, in all four teeth, and three of them on one side back; it made a very doubtful and awkward kind of job. We made the central cavity as in the first case described, but failed to render it successful. The atmosphere could be exhausted and the pressure obtained, but the least touch would cause the piece to tilt. While battling with this plate, as we had swedged it up twice, we received a second letter from Mr. Gilbert, dated New Haven, November 16th, in which he makes the following remarks: "Allow me to say a few words in regard to the air-chamber. I have seen many plates got up by different dentists, but in some of them I have noticed that the chamber was too large and too shallow from my experience. I think that a chamber of moderate size, and of reasonable depth, is much better than a shallow and large one. When the chamber is large, it necessarily approaches nearer the alveolar ridge than would a smaller one, consequently, when the plate starts by hitting something hard, it would fall sooner than it would if it were not so near. The reason, I think, is readily seen." He also thinks that plates are generally extended too far back over the palate. This fact comes to us with more force than all else that has been written on atmospheric pressure plates. It tells the whole story. We made a new plate at once upon the receipt of this last letter, for the gentleman above referred to. We constructed the chamber one-third smaller, and about four lines in depth, swedged it up sharp where the border impinged on the gum, but made the chamber of an oval shape to look something like the half of a bullet-shaped button. When the job was completed, we placed it in the mouth; the fit was good, and the first day that it was worn the gentleman chewed a water-cracker on the two molars and bicuspid on the right side. He said he could, apparently twist it about in the mouth, but did not lose the pressure or hold on the roof of the mouth. It is a perfect success.

We wish to stop here and ask the profession whether this is not enough on cavity plates, and to establish their vast superiority over the plain plate? To diverge from this point would only be to enter the fields of theory and doubtful practice.

PROFESSIONAL STANDING.

BY W. H. ATKINSON, M.D.

Elevation, in professions as in nature's other departments, delivers from contentions and antagonisms in the little and pestiferous sense. The highest sort of argument never "contends;" it simply points out the propositions that contain the basis of the matter under consideration, and then trusts to the inherent strength of the position to decide. This destroys contentions, strife, bluster, and elevates our efforts in research into a noble emulation, in all our investigations which are not clear at first view. In nature the ethereal vastness between the planetary bodies is one grand field of perfectly harmonious relations. The upper currents of atmosphere become more and more harmonious as they ascend to the thinner, purer, and higher strata on the periphery of the atmospheric zone; while the violence of contending currents, constituting winds and storms, increase as they approach the surface of the ponderable and immovable "conservative" earth's crust; and though unseen by the eye, these currents gather force as they advance, till, finally, everything ponderable and massive become as nothing in their destructive, devastating march; and then we plainly see, hear, and feel the effects that depend upon this unseen and to some minds incomprehensible power. The dizzy gyrations of the whirlwind will portray the unsettled and incongruous states of newly-begotten professions or members but just introduced into them, who make no scruple to appropriate all the "rights, privileges, and immunities" said to belong thereto, in utter obliviousness of the fitness of preparation to entitle them justly and honorably to possess them. He who is really advanced to high ability in any profession, will care less to be recognized by others, than to see them make themselves worthy of high and honorable recognition, by the refined and illuminated in professional and general society. No advanced competent teacher or practitioner can afford to descend to the substratum of crimination, distrust, and hate, so painfully prevalent among common professional men. So the sooner we lay aside all these low practices, the greater and quicker will our levity become, to ascend to the purer atmosphere of scientific certitude and complete competency in all that is worthy of the ambition of a truly professional man. Titles, diplomas, degrees, and recognition by those already in the profession, do and ought to please the recipient of all these at the first experiences, but if these continue to occupy his attention and regard, after he has once proved how entirely empty of glory they are, he is a finished edifice, and you may as well put on the capstone and roof and let him *stand.* Such as he, are those that care more for show and shallow joys than the higher consciousness of full efficiency for good, to all with whom they may have to do.

Where are they who are cumbered with the dead weights of a false "dignity" and of ridiculous "airs," to the extinction of pure Christian joy and childlike innocence in all they feel, think, or do? Could we each and all but feel the imperative necessity there is for us to "look aloft" to keep us from becoming dizzy and crazed with our surroundings in the day of our proudest success, we could the more easily put on in earnest the true professional character. But so almost universal has it become to desire to pass for a false value in professional and social life, that the real type of what professional men should be, is rare; indeed, so rare, that if we were about to call upon a limner to portray the character, I know not, in practical life, where we could find a sitter. One blessed reflection comes to our relief in the thought, that the ideal conception has found lodgment in our minds, and this, if we allow it, will create a thirst to work up to this ideal standard and at length realize the type. And now let us, as many as have the idea within us, set about it at once.

New York, December, 1861.

"REFORMATION."

BY S. MARLOR, OF ENGLAND.

In the Dental Cosmos for December, is to be found an article on "Reformation," by J. S. Latimer, of New York, and as some statements therein are at variance with each other and calculated to misrepresent, not only the dental profession generally, but more especially professors, graduates, and matriculants of dental colleges, I deem a reply necessary. In the beginning of the article he attempts to show that he is in favor of the advancement of the science, and willing to render "homage to whom homage is due;" and had he so confined himself, I, and all who have the interest of the profession at heart, would have been satisfied that he was willing to add his mite thereto. But I cannot conceive how any one, after carefully reading the article, can construe it any other than as derogatory to himself, and endeavoring to cast a stigma upon the profession. I will endeavor, without bias or prejudice, (not being acquainted with the writer,) to show the inconsistencies of certain parts of the article entitled "Reformation."

First, he speaks of the profession having worked its way up from quackery to scientific and honorable professions, and to Americans he gives the glory, to which I say, Amen. He acknowledges that the advancement of the science is through conventions, colleges, and journals, and says the time has almost passed in which men with little general education and a few weeks' pupilage can be ranked as recognized dentists. He also advises the increase of local societies, suppression of jealousies, and remarks that the senseless bickerings of those in rival interests, who control some of our journals, do much to disorganize societies by creating jealousies, and hopes the practice of filling valuable space with venom of personal pique, will soon cease to deprive subscribers of the useful matter they have a right to expect.

He proceeds to tell us that the colleges require remodeling to suit the requirement of the times, and what is required of the matriculant, and would have the world to understand that many enter the "machine" (*i.e.* college) with a mere fraction of either mental or moral qualification, but generously admits a slight improvement when they leave, and attributes it to the *basis of the terms of graduation*, and gives as illustrations—

First. A stonecutter learning the "trade" from an itinerant quack, in the short space of three weeks; but grants that the quack is somewhat acquainted with the contents of the *News Letter;* but the poor stonecutter he denies having either time or inclination to study, it being *hereditary* in the family. He grants that the pupil stonecutter so far succeeds in his new avocation that in two years he purchases his partner's interest, begins practicing on his own account, and in four years and eight months resolves upon graduating at a dental college, and there acquire a knowledge of different sciences, besides making three silver plates set with plain teeth, and all in the space of four months. Furthermore, grants him an examination and reception of a diploma; but not a whit the better off with his four years and eight months study, or small practice at the college, for, to use his words, a *leopard can change his spots easier, than he can become habitually a studious man.*

How does he know but that the poor stonecutter, after having passed a portion of his life in practice as a "quack," became satisfied that honor attended the profession, and although not the fortune to be born rich in knowledge, still was desirous of adding a little to that he had already acquired by patience and perseverance, and knowing that it could only be obtained at the college, thither he repaired for that purpose, and in this agreeing with Dr. L., *that the advancement of the science is through the colleges.*

How does the doctor know but that the unfortunate stonecutter in early life might have been as eager for learning as himself, had not circumstances, over which he had no control, prevented him; and instead of having wealthy parents, and being brought up in luxury and affluence, it was with difficulty he could earn sufficient self-support—instead of being able to attend a university or even a common school, he had by hard study and without aid, during hours which his body required for rest, acquired a *smattering of the knowledge* he possessed, when he first had instructions from the "quack;" if so, I hold that more credit is due to the stonecutting D.D.S. by far, than he who has had the good fortune to have acquired a *smattering* of university knowledge, and the privilege of a D.D.S. preceptor; for it is a well-known fact that some of the most talented men in almost every business or profession, by study, patience, and perseverance have attained an enviable position in life; and this is the case even among the dental profession.

If Dr. L. desires, as he says, the watchword to be "onward," he will be anxious not only that a poor stonecutter, but every person, no matter what his calling may have been in early life, desirous of becoming perfect in the profession, shall look to the dental colleges, as being the only places through which a thorough knowledge can be obtained of everything that is actually necessary for the dental student, in order to attain anything like perfection in the art, and although he may not be able to acquire a thorough knowledge of all the different branches enumerated by Dr. L. in the four months, still he may acquire sufficient to enable him to perfect himself after leaving the college.

The second case illustrated by Dr. L. is quite the reverse to the first; he is represented as being a child of wealth, with every opportunity of obtaining a superior education, but, through love of pleasure, he only attained a smattering of it.

He further describes him of fine address, but lacking patience, perseverance, etc., and even deficient in *common honesty*, and known about town as a wild and fashionable debauché; but, unlike the stonecutter, he stays with his uncle two years, and then his father sends him to the college for two years, the first of which he says is devoted to vice. If such be the case, why does he extol the colleges in the first part of his article?

The second term at college is represented as worse than the first, by the student being an attraction to disreputable females and their carousals and so a disgrace to the college and profession. Is it possible that Dr. L. would have the public to understand that such proceedings were allowed in the college from which he obtained his "*parchment?*"

He further alludes to the method pursued in order to obtain the "to whom it may concern," *and admit him to a position in which he can do the most harm*, and winds up by endeavoring to show wherein the Faculty lack discriminating power. With regard to the manner which he mentions of obtaining a diploma, and incompetency of the professors, I cannot conceive how he could have obtained such information, feeling confident that no student would be fool enough to tell him; consequently, not only I, but many others who have read his article, have naturally arrived at the conclusion that he himself must have resorted to the method he so graphically describes, and in that, he considers the professors did lack in discriminating power. It is plain and obvious to every unbiased mind that it is out of the nature of things for professors of colleges to obtain a correct history of the past life of each student; neither is it their business, nor have they any control over the student outside the college. Where there are fifty or sixty young men, it cannot be expected that all are perfect—some of them may love pleasure more than study—but because one or two happen not to have settled down in life, are the professors to blame, and are the future students, and the colleges, to have the stigma cast upon them which has been attempted by Dr. L.?

Although he makes no special application of his charges, but applies them to dental colleges generally, and as he is a graduate of the Pennsylvania Dental College, and I a student of that institution, I feel impelled to refute the charges preferred by him against the professors, with regard to either lack in discriminating power or anything else that can be advanced for the benefit of the student. The moral and professional character of each one is not second to that of Dr. L. or any other member of the profession, and the reputation of the college is well established throughout the world, from the fact of its representatives being found in every quarter. I also have reason to believe that the moral and professional character of the students at the present session will favorably compare with that of any graduate—neither do I know of one answering the description he has so fearfully portrayed.

It seems to have been the intention of Dr. L. to preface his "*venom of personal pique*," relative to the colleges, and their professors, and matriculants, by an attempt to prove that he had acquired his knowledge of the dental art previous to his term at the college, in a different manner to others, and that he was unlike either the first or second personic illustration described by him, and also had the advantages of an early education, and that he had both the time and inclination to study, and that he was a remarkably exemplary person generally. Is such the case? Echo answers. "Persons living in glass houses should not throw stones," is an old saying, and may be applicable in his case; and such articles as that in the DENTAL COSMOS under the head of "Reformation," instead of adding "onward" as the watchword, are calculated to injure the cause, and certainly, "*if published and occupying valuable space, will deprive subscribers of the useful matter they have a right to expect.*"

It is a well-known fact that some of the most talented men in the dental profession, and who have done much toward the advancement of the science, have risen to eminence by study, patience, and perseverance, and acquired all their learning in early life without the aid of a tutor.

This, as has already been said, is true not only as regards the dental, but every other profession; and many who have erred in early life, have in later years become bright ornaments, and eliminated a degree of knowledge not attained by even those who thoroughly understand "*little things.*"

PHILADELPHIA, December 13, 1861.

AN IDEA ON TEETH.

BY GEO. S. KING, M.D.

SOMETIMES a whole profession is fully satisfied as to the validity of a scientific principle, especially if it appear to be established upon accurate experimentation, according to the spirit of the present age, and yet that profession is startled with an announcement, from some experimenter of well-established character, that it has all this time misunderstood Nature's meaning in the premises, and that some other principle, more or less the converse of this, is the true. One illustration will suffice.

Corrosive sublimate had always been considered and prescribed by the medical profession as the bichloride of mercury, $Hg.\ Cl._2$ and calomel as the protochloride of mercury, $Hg.\ Cl.$ Nine or ten years ago somebody discovered that the former was the protochloride, and the latter the subchloride, or *di*-chloride, as it might be called, $Hg._2\ Cl.$ The most unscientific reader would readily perceive that the distinction between calomel and corrosive sublimate is a matter of some practical importance to the community. In still later years we are told that the chemists have gone back to the old creed on this subject, and of course the profession must adopt their decision. This latter conclusion does not weaken my proposition, in my opinion, but rather multiplies the evidence. I wish to bring these remarks to bear upon a belief that seems to be general among members of the dental profession, and which is therefore accredited among their patients, that one decaying tooth will infect another, or even both its immediate neighbors. Now I do not start out to assert that this is not true, nor have I any positive facts with which to undermine it; but I entertain a suspicion that in this case a conclusion has been jumped at, merely because it was so plausible that further investigation seemed unnecessary. And yet for all that, it may be exactly the wrong interpretation. I only say it may be wrong. My reasons for suspecting it are these :—

For decomposition to begin from the outside of a tooth, it would require that the enamel should decompose first: now the microscope has revealed that the enamel has no capillaries that could possibly transmit the fluids of the blood, and no nerves; therefore it is purely an inorganic body, deposited but once, and subject to neither nutritive nor destructive assimilation: and chemistry has revealed that this mineral is nearly elementary, being composed of only two elements, fluorine and calcium, and that it is about the hardest substance known, except the diamond and an alloy of irridium and osmium; consequently it is hardly probable that it would yield very readily to the action of such reagents as are eliminated in the process of a fermentation so mild as to be constantly going on under our very nose, as one might say, without being perceived by any of the senses. The suggestion which follows is, then, that the decay originates from within the tooth.

The dentine, which forms the crown, has capillary pores, differing from arteries and veins in that they only admit the colorless portion of the blood. And the osseous substance, which forms the fang or root, has both capilliary blood-vessels and nerves. These both, therefore, are organic bodies, and necessarily both liable to disease; which it is not difficult to conceive might very soon destroy the little vitality of a tissue of so low an order of organization as the dentine. Let us suppose one branch of either of the maxillary nerves giving filaments to two teeth (rarely to three) to be the subject of disease, or at least its functions rendered morbid by disease in the particular sub-tract of the brain which gives origin to its fibers; experience shows that even a small branch of a nerve may be so depressed in its function as to cause—or, according to the modern theory, to allow—inflammation in a single small tissue, such as the conjunctival or the sclerotic coat of the eye, or even the capsule of the lens, to run never so high, without in the least endangering its neighboring tissues of different characters and functions: the explanation of this lies in the noticeable fact, that the nerves do not branch, like the arteries and veins and absorbent vessels, though they seem to; by careful dissection under the microscope, each individual filament of a nerve may be traced to the brain, nowhere inosculating with any other filament.

These are sufficient reasons why two, or even three, teeth might decay internally at the same time; and the first that would show it externally would be simply the first whose unsupported enamel might happen to be broken in the act of mastication or otherwise; the rationale of their death being in effect the same as of that of frozen limbs; their life being choked out by the quantity of blood drawn to the parts by their morbid condition. A number of little observations bear me out in this; ex. gr., Case I. The dentist tells Miss B.; "This tooth has but a small cavity, but if you don't have it taken out, it will cause you to lose one on each side of it." Miss B. forthwith has tooth No. 1 thoroughly cleaned out and filled with gold, so that no decay remains, to be spread; and nevertheless, the dentist observes cavities in teeth No. 2 and 3 a month or two afterward; and eventually Miss B. loses all three. Case II. Mr. K., not suspecting himself to be a foul-mouthed man, happens in the office with an afflicted friend; the dentist examines Mr. K.'s teeth, "just to be on the safe side," and finds, with the assistance of a fine-pointed instrument and a little muscular skill, several small fissures; he advises plugging, which Mr. K., being a man of moderate means, postpones *sine die.* Years afterward "a friend in the business" of Mr. K.'s, finds the enamel of these same teeth unbroken except at the aforesaid small fissures; but, on penetrating, finds the crowns dead, but not decomposed: the carious dentine was then removed, its place supplied with gold, and the teeth have done good service up to the present time.

I do not assume on these evidences that the enamel is never destroyed by chemical actions; but I do claim that one possible and very probable cause of the destruction of teeth has been heretofore overlooked by many, and that, as a consequence, many teeth have been prematurely sacrificed which might at least have done many years of good service in their condition of decadence, without detriment to their neighbors. If some of our enterprising dentists should be at the pains to disprove my theory by the results of accurate investigation, the error I will have fallen into will have served the one good purpose of giving a direction to the search for truth, and I should be proud to bow to the verdict of Science.

New York, December, 1861.

LITTLE THINGS.

BY J. S. LATIMER, D.D.S.

Alkanet is useful for coloring the varnish used in impressions; for, in removing the model from the plaster impression, it is sometimes necessary to cut nearly or quite through the impression, that it may fracture, and permit the safe removal of the model. The utility of a colored varnish on the impression is patent without explanation. Alkanet root yields its coloring principle to alcohol readily, and to water sparingly.

OSTEOPLASTY is useful, in very sensitive teeth, as a temporary filling. This substance behaves badly when the saliva comes in contact with it before hardening commences. To prevent the contact of saliva with the newly-inserted filling, I cover the surface with a little varnish, which does not affect the hardening process. The varnish may be a solution in chloroform, ether, or alcohol; but, in any case, the saliva should be kept away until the evaporation of the solvent.

DENTIFRICE is a word for which we often improperly substitute "*dentrifice.*" There is, properly, no such word as dentrifice. The word is from *dens*, a tooth, and *frice*, to rub.

GUTTA-PERCHA, in sheets, costs $2 per pound. Economy is a virtue. Gutta-percha that has been once used should not be thrown away, but, when accumulated in sufficient quantity, it may be partially freed from wax and plaster, and then boiled in water. The wax will then rise to the surface, and may be skimmed off; after which the gutta-percha may be removed, kneaded, and rolled. It is then as good as at first.

A WEDGE OF WOOD is often the most convenient and efficacious instrument for preventing exudations from the gums from moistening the gold, while plugging teeth. Usually, this means will be more effectual if the wedge shall be moistened with creosote, or the perchloride of iron. In one case, the wedge thus saturated behaved admirably, and I was pleased that the gum did not bleed on the removal of the wedge. A few days subsequently, however, I found considerable inflammation at that point, which, I concluded, was consequent on congestion; hence, I have made sure that the congestion is relieved in every instance, since that experience, by slight depletion of the gum, using the point of a lance or sharp excavator for that purpose, when bleeding does not follow the removal of the wedge.

THE CRYSTALLIZATION AND EXPANSION OF AMALGAM were incidentally asserted by me in a former paper, on which points Prof. Watt, of the *Dental Register of the West*, is avowedly skeptical. Recently-instituted experiments, with a simple but effective instrument, have shown an expansion which commenced after twenty-four hours, and continued for eleven days. The amalgam used was manufactured by Dr. S. S. White, after the Townsend formula. The strip of amalgam was two inches in length, and its greatest expansion a trifle more than $\frac{1}{128}$th of an inch. As to the *manner* of hardening, *Fownes's Chemistry* (p. 306) says: "Besides this, many of the amalgams *crystallize*, after awhile, becoming solid. The amalgam of tin used in silvering looking-glasses, and that of silver sometimes employed for stopping hollow teeth, are examples." Also see *Piggott's Dental Chemistry and Metallurgy*, (p. 444,) where we find the opinion of the author thus mentioned: "The more solid amalgams are *crystalline*, and so soft as to be capable of being kneaded." *Harris's Dictionary*, describing the manner of making "crystal gold," says : "The gold is first amalgamated with four to twelve times its weight of mercury, triturated, heated to 180° Fahr., and set aside for several hours. A CRYSTALLINE amalgam of gold and mercury is thus formed." I quote these authorities merely to show the generally received opinion, and not to prove that the world does not move. Will Prof. W. give us his theory?

HAMMERING STEEL SQUARE for small cutting instruments, has been claimed to be superior to the common method of forging the wire nearly round, by which, it was asserted, the wire became split. Mr. Biddle, of this city, (New York,) made some instruments for me by preserving the quadrangular form of the wire, but I have been unable to discover any advantage in the process.

NEW YORK, December, 1861.

ON HARDENING AND TEMPERING INSTRUMENTS.

BY T. L. BUCKINGHAM, D.D.S.

THERE is, perhaps, nothing that annoys an operator more than to have his instruments break, or the points turn at a time when he is most intent on performing some difficult operation; and yet there is nothing more likely to happen. Our instruments are frequently either too hard or too soft; or, what often happens, when our instruments are the right temper, they are not of the proper shape. It is, therefore, necessary that every operator should be able to make or point his instruments. Now I would not advise any operator to spend his time forging and filing up instruments, merely to be able to say that he made them himself, as I have known some to do.

It may be necessary, sometimes, to make a few for patterns. But almost every week we are compelled to point some.

The process of annealing, hardening, and tempering instruments has been so often and fully described, it appears almost superfluous to write any more about it; still there are two or three points that I have not seen clearly stated: first, the annealing; we all know this is done by heating the instrument up to as high a temperature as we would if we were going to harden it, and then allowing it to cool slowly; but, as the points of the instrument are very small, they generally cool so quickly, when exposed to the air, that they are only partially annealed in this way, unless we heat them very hot, and then we are liable to injure the steel. The best way I know of annealing them is to take a metallic tube, (either brass or iron will answer,) about half or three quarters of an inch in diameter, and two or three inches long, fill it with powdered charcoal; then run the points of the instruments to be annealed into the charcoal; (when there are many to anneal, they can be run in at both ends of the tube;) lay the tube on a piece of charcoal, and heat it up with the blow-pipe until it is a full red heat; allow it to cool in the air with the points in the charcoal, when the points of the instruments will be found to be as soft as steel can be made. I have, in this way, been enabled to anneal the very fine broaches which we use for removing nerves, so as to make them as soft and pliable as the best annealed wire; nor is there any danger of injuring the steel by over-heating it; the charcoal not only prevents it from oxidizing, but also has a tendency to improve the quality. The next thing to be done, after they have been made the required shape, is to harden them. This is done by heating them to a certain temperature; the heat is judged by the color; the color is usually described as cherry red. When steel is heated to this color, and plunged instantly into cold water, it becomes too hard and brittle to be used for instruments. An important point to to be considered now is the degree of heat required to produce this color, and this depends very much upon the light in which they are heated; if we heat a piece of metal in a dark room it becomes red hot at a much lower temperature than when it is heated in daylight.

According to Sir H. Davy's experiments, "bodies begin to appear luminous in a dark place at about 810 degrees. A dull red, visible in daylight, is probably equal to about 1000." A difference of 190° is made in the light in which the article is heated. We generally use alcohol, oil, or gas, to heat our instruments. Alcohol gives very little light to the amount of heat, oil or gas gives much more light. The effects of the light can be shown by melting some pieces of solder on a plate with different lamps; with alcohol the plate will appear much hotter before the solder melts than it will if oil or gas is used, and as it is important to harden steel at as low a temperature as it can be done, the effects of the light on the color should be remembered.

There is another and perhaps a more important effect to be considered, and that is the temperature of the cooling medium. If a heated instrument is plunged into hot water, it will not be so hard as it would have been had it been cooled in very cold water.

Mr. Brande, in his Manual of Chemistry, says that "the degree of hardness attainable by steel will depend upon the heat to which it has been raised, and the coldness of the water or other medium into which it is plunged, so that when very cold water cannot be procured, the die or other article must be heated proportionately high. A dull, red heat into water at 34°, a cherry red into water at 50°, an orange heat into water at 80°, and a dull, white heat into water at 100°, produce nearly the same effects; but the real hardness attained in the water which is warm never equals that given by cold water."

The temperature of the cooling substances has the effect not only on steel when it is hardened, but it has as great an effect when it is tempered or in drawing the hardness down to a degree of hardness suitable for use. As this is done by heating the hardened steel until it presents a certain color, and then cooling it suddenly, the coldness of the water is here of as much importance as it is when the steel is hardened.

It is not to be supposed that rules can be laid down by which any and every person can harden and temper steel equal to the best; but the few facts presented may enable beginners to overcome some of the difficulties they have met with. In this as in all other operations we can only learn how to do it properly by practice.

PHILADELPHIA, December, 1861.

THE PROFESSION IN ENGLAND.

(FROM OUR LONDON CORRESPONDENT.)

AFTER a long silence, I once more address you on the professional events of the times. The communication will be brief, and yet it will be important. Of the opening of the sixth session of the College of Dentists, and of the other meetings usual to this period of the year, you will, ere this comes to hand, have had advice in the English dental publications; and, therefore, I will only say that the friends of the movement having for its object the consolidation of the profession upon an independent basis, have good reason for congratulation as to the sure progress of their cause. But I must now come to the point. After many months of quiet working, the "NATIONAL DENTAL HOSPITAL" has been completely organized, and was formally opened on Monday, November 11th instant, a day which will be ever memorable in the annals of our calling. The Metropolitan School of Dental Science, which belongs to the College of Dentists, only wanted such a hospital to place it in a position of stability. The pupils will now have means of attaining to *practical* experience, in addition to the great advantages they possess in attending to the instructions of the eminent professors who are connected with the school, as lecturers.

The inaugural meeting at the Hospital was presided over by Dr. J. Brady, (Member of Parliament,) who forcibly pointed out its necessity, both to the poor and to students, and, at the same time, he took occasion to express his unqualified dislike to the nondescript dental certificate system of the College of Surgeons, and advocated the bold step of those who are engaged in moulding dentists into independence as a profession. The Chairman was supported by Mr. Robinson, (to whom the establishment of the Hospital is mainly due,) Mr. Imrie, Mr. Perkins, Mr. Holme, Mr. Hockley, Mr. Wood, Mr. Rymer, Dr. Cone, Mr. Vidler, (Hon. Sec.,) and a room more than full of other gentlemen known as reformers in the profession.

The whole affair was entirely successful; £300 was announced as the first installment of the needful for carrying on the good work. The Hospital is situated in Great Portland Street, a main and central London thoroughfare.

In conclusion, I must tell you very briefly, (for post time is just up,) (1) that Mr. Perkins has resigned his lectureship on Dental Mechanics at the Metropolitan School, and is succeeded most satisfactorily by Mr. Hockley. Mr. P.'s reasons for giving up were want of leisure, and not want of interest. He carries the best wishes of the School with him. (2) Dr. Cone, of Philadelphia, gave an excellent paper on "Treatment of Children's Teeth," at the College of Dentists on the 4th instant.

Lastly, we hope to see many of our professional brethren from America at a Convention in London next year, and may no political differences prevent a noble meeting on neutral ground.

London, November, 1861.

Entered, according to Act of Congress, in the year 1860, by Jones & White, in the Clerk's Office of the District Court for the Eastern District of Pennsylvania.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

BY DRS. CH. ROBIN AND E. MAGITOT.

[Translated for the Dental Cosmos, from the "*Journal de la Physiologie de l'Homme et des Animaux,*" Dr. E. Brown-Séquard, editor, by E. Sureau.]

Development of the globules of dentine.—The formation in the ivory of the dental canaliculi, the secondary branches of these canaliculi, and the anastomotic cavities is not the only phenomenon which indicates the work of development in the tooth. Another interesting particularity ought to be pointed out, and that is the appearance of the *globules of dentine.*

These globules are small, transparent, spheroidal masses, composed of normal dentine, crossed in the usual manner by tubes, (pl. xii., fig. 3.) They begin to show themselves early at the bulb-face of the dentinal caps, then but little developed. It is, however, necessary to remark that these globules never occur in contact with, or in the neighborhood of the cells, but are always met on the lower face or in the interior of the ivory, which is already formed or in process of development. When the globules have once appeared they can be found and followed during the entire period of dental evolution.

In the teeth yet contained in the follicle, the globules frequently show themselves on a rather extended surface, and quite close to each other, so as to form a sort of bed of a regular appearance in which the smallest globules are nearest the free edge, while their dimensions are increased on the opposite side—the volume of the globules varies from four or five-thousandths of a millimetre to one, two, and three-hundredths of a millimetre. The last diameter is found only in quite advanced teeth. In consequence of their shape, which is always globulous, they present more or less numerous points of continuity with the homogeneous substance of the ivory. Occasionally, there is a globule nearly ovoid, and often many of them are united in a single mass, which then appears more or less regularly mammillated, but in no circumstances are these globules found free either in the preparation or on the surface of the bulb to which they are contiguous. Consequently, they must not be considered as produced by the bulb, and afterward united either by the dentine or between themselves. Their continuity with the ivory, their independence of the bulb, and at the same time the circumstance that the smallest occupy the thin parts, and the largest the thick parts of the dentinal cap, prove that their production is due to a phenomenon inherent in the ivory itself, whose substance, by virtue of a particular influence, is no longer produced in a regular and continuous manner, but in an unequal fashion—so that being developed without measure in some places, the dentine constitutes a series of expansions or rounded projections, which impress a corresponding depression on the bulb.

This mode of production, resulting from a modification of the dental substance and not from an independent genesis, is conformable at the same time to the fact mentioned above, that their presence is observed only at points of the dentine where the cells no longer exist, and where the ivory has a depth of at least several hundredths of a millimetre. It is also necessary to remark that the time of the appearance of the globules follows no determined rule relative to the canaliculi. Thus the orifices of the canaliculi can be found as well on any point of the surface of the globule as in the intervals, so that the largest of the globules may be crossed through and through by many canaliculi, the orifices of which are then found on the free surface of the globules.*

The globules of dentine, by their progressive augmentation of volume, soon encounter each other and mutually unite, leaving spaces necessarily between the points of contact, (Czermak's interglobular spaces;) these spaces are of variable size and configuration. The development continues to progress, and the cavities are soon completely filled with a new production of ivory, so that the globules are ultimately inclosed on all parts in the dentine. Sometimes, however, in delicate subjects, or in malformed teeth, the interglobular spaces remain open during the whole life, and it is easy to comprehend that a great number of them in the ivory of one tooth would constitute a vice of structure which would have a favorable influence on the progress of certain dental affections, caries for instance. The interglobular spaces, while they continue, sometimes receive the anastomosis of one or more canaliculi whose course they interrupt, and whose contents are consequently thrown into their interior. We must not, however, confound them with the small anastomotic cavities of the canaliculi, described above, and which occupy the terminal extremities of the tubes. The particular situation of the interglobular spaces in the course of the principal trunks, with their special form, and the nature of their walls represented by the convex surface of the globules themselves, are characteristics sufficient to distinguish them.

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* Various authors have given different explanations of the cause of the production of the globules of dentine. Czermak, who was the first to describe them, (*Beitræge zur mikroskopischen Anatomie der menschlichen Zæhne, Zeitschrift für wissenschaftliche Zoologie*, Leipzig, 1850, 8vo., vol. ii. pl. xvii. and xviii. p. 295,) considers them as hollow in the centre, and formed at the lower face of the ivory by a deposit of dentine after the fashion of stalactites. Salter, (*Quarterly Journal of Microscopic Science*, July, 1853,) without believing with Czermak, that they are hollow, nevertheless agrees with him in his opinion upon the manner of their development. Kölliker, who regards them as pathological productions, remarks that they are disposed in the interior of the ivory in regular lines, (Richard Owen's lines of outline.) But he confounds the interglobular spaces filled, according to Hoppe and himself, with a soft, cartilaginous matter, with the small anastomotic cavities of the canaliculi, situated in the neighborhood of the enamel, (Kölliker, *Histologie humaine*, French translation, 1856, p. 419.)

The intimate modifications of which the ivory is the seat during the whole period of its evolution lead to a progressively increasing assimilation of calcareous materials, which produces a corresponding augmentation in the density and resistance of the ivory tissue.

Also, at the beginning of its formation, the ivory in a thin cap of dentine offers a soft, elastic consistence. The substance gradually acquires very great hardness, the calcareous assimilation continues through life, and the result is, in the old for instance, that the teeth have acquired such hardness and such friability that they are exceedingly brittle, and their extraction, when they are not loosened, is occasionally attended by insurmountable difficulties.

The phenomenon of the progressive induration of the dental substance corresponds in the centre of the tissue to two particularities, which are, on one hand, the continuous calcareous assimilation of the fundamental substance of the ivory, whose proportion of organic matter is relatively diminished; and on the other hand, the progressive reduction of the calibre of the canaliculi and of their divisions. These two phenomena become so prominent in advanced age that the tubes are finally sometimes almost entirely obliterated, so that the ivory exhibits merely one compact, homogeneous, brittle, and extremely hard substance. The intimate result of these changes is the corresponding modifications in the relative proportions of the organic and inorganic elements of the ivory, and while at the commencement of the formation the first predominate over the second, the relation is reversed in advanced age.*

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* This circumstance will sufficiently explain the differences presented by the chemical analyses which have been made in the ivory, without taking into consideration the age of the teeth which have been examined.

Besides the intimate modifications of structure and consistence which the phenomena of development produce in the ivory, it should also be noticed that the gradual increase in the thickness of the tooth leads to a gradual diminution of the bulb cavity with a corresponding and progressive atrophy of the bulb. The regularity of this phenomenon is such that the tooth as a whole, the pulp cavity, and the pulp itself, all three preserve one identical form. Thus, as we have already stated, in consequence of the continued production of new dentine on the walls of the pulp cavity, the latter is atrophied, and sometimes even completely disappears toward the end of life. The tooth then seems to have achieved all the phases of its individual existence, and by a spontaneous fall abandons its place in the economy.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of December 10th, 1861, at eight o'clock.

President, Dr. T. L. Buckingham, in the Chair.

Present, Drs. Flagg, McQuillen, Dixon, Peirce, Fitch, Roberts, Barker, and the class of students in attendance at the Dental College.

The subject for discussion, being

"THE CAUSES AND TREATMENT OF DISCOLORED TEETH,"

was opened by Dr. Barker, who said, the most fruitful cause of discolored teeth was to be found in the death and subsequent disintegration of the pulp, and that any influence that would produce this result, such, for instance, as mechanical injuries, exposure of pulp, from decay, periosteal irritation, the changes of temperature through a thin septum of dentine beneath a filling, improperly introduced amalgam and gold fillings, might all be classed as indirect causes inducing discoloration. As a general rule, the discoloration is more frequently seen in the anterior superior teeth, destroying in many cases the beautiful effect of a dental arch. This condition is a source of constant regret and mortification to our patients, and we are called upon and begged to restore the blackened teeth to their normal complexion. Fortunately for us, in many cases this can be accomplished, though he regretted that many in the profession were unwilling to attempt a restoration; and because of a failure or failures in previous cases, would not again make any effort to relieve the patient. In many cases the discoloration of teeth is more apparent than real, being due to the presence of decomposed and softened dentine in the cavity of decay and pulp canal, the living tissue having absorbed to some extent the organic matter of the devitalized pulp. A successful result of restoration to normal color in such cases can be accomplished by opening into the pulp cavity, thoroughly washing out its contents, at the same time removing all dead matter from the crown and fang, cutting to some extent into the living healthy structure of the tooth.

The discoloration which results from the open-mouthed tubuli opening into the pulp cavity absorbing by endosmodic action the broken-down and disintegrated blood corpuscles, the hematine of which produces the opacity, could, he thought, in many cases be removed by the judicious application of some of the chemical agents termed, perhaps erroneously, "bleachers." In his own hands chloride of lime combined with prepared chalk had been exceedingly successful, having first been induced to try them from the happy result attained by his friend Dr. Flagg with a discolored tooth in his own mouth. As that gentleman was present, he would leave to him the description of the methods of manipulation necessary to obtain a satisfactory result.

Dr. Dixon said, his experience had been that teeth could not be restored to color after they had become dark; he would confess that he had met with but little success in his efforts, and particularly with the chemical agents which had been so often recommended to the profession. The cutting away of considerable bone and subsequent filling with gold had accomplished in his hands better results than any other method.

Dr. Fitch said, he had paid some little attention to this matter of bleaching teeth, and thought the subject of sufficient importance to demand the most careful experiments of every dental practitioner. The coloring material, from whatever source originating, enters the tooth, as a general thing, mechanically. To meet this indication, therefore, treatment should be mainly directed to the removal of any such matter by a resort to mechanical rather than chemical means; but whether by a physical or chemical process, such agents should be employed as will act directly upon the specific coloring substance and not upon the texture of the tooth.

Considered that the idea at the present time most prevalent in the profession is, that discolored teeth cannot be restored to their normal complexion, especially those colored by products arising from the disintegration of the dental pulp or endodonteum, also from metallic paste and tin fillings. Coloring particles originating from these sources are not incorporated into the substance of the tooth so as to constitute a part essential to its structural integrity, but taken into the tooth by tubular imbibition and held *in situ* mechanically. He thought it highly probable that the causes of discoloration are better understood than the means of treatment, and believed the aplastic or fluid condition of the blood was a fruitful source of discoloration. A resolution of the capsular membrane of the blood disks frequently follows this condition. The liquor sanguinis then readily floats into the dentinal tubuli, conveying much that may afterward prove highly deleterious to the complexion of the tooth. Thought it possible for the red corpuscles, under certain circumstances, to find their way into the dentine. The capsules, or external covering of these blood corpuscles, being gelatinous and compressible or slightly elastic, and having their axis a trifle elongated by compression, render it possible for them to pass into the larger tubuli of the tooth. Was well aware that this position has been, and now is, questioned by dental physiologists.

As to treatment, the first thing necessary is to remove all foreign impacted matter from the pulp chamber and fang canals of the tooth. When the dentine has been mostly removed by decomposition, the tooth may be very much improved in color by introducing at the time of filling some pliable white texture, such as tissue paper, between the enamel wall and gold. Many times by washing the interior of this class of teeth with the syringe and chlorinated soda in solution, or simple warm water, and then leaving their cavities open for a few days, their appearance will be materially improved.

Has been very successful with chlorinated lime, introduced into the cavity of the tooth to be bleached; usually saturates cotton in a strong solution, and allows it to remain twenty or twenty-four hours before examining its bleaching results. After such treatment, pursued a longer or shorter time, depending upon the peculiar conditions attending the individual case, teeth very much colored have been restored to a complexion nearly approximating their healthy neighbors.

Has experimented with teeth removed from the mouth, by exposing them to the action of various agents; but found none of them so highly serviceable, possessing so strong bleaching properties, and at the same time so harmless to the tooth, as chlorinated lime. At first thought that its caustic nature would preclude its use as a tooth bleacher, but experiment had proved these views entirely erroneous. A solution sufficiently strong for bleaching purposes was not a caustic to the tooth in any sense.

Dr. Flagg would desire in the first place to say, briefly, that he regarded discolored teeth as divisible into two classes—1st. Those which had assumed a reddish or brownish hue from congestion of the pulp or peridentium. 2d. Those which had a bluish or blackish tint, resulting from putrescent pulps; tubular imbibition of extraneous coloring matter derived from food; or the former practice of filling pulp cavities and fang canals with pulverized charcoal, used on account of its antiseptic properties. Of the first class he would say that, in recent cases, after the practitioner had given vent to the undue collection and stagnation of blood, either within or without the affected tooth, by medicinal or mechanical means, nature would generally effect a restoration to normal condition of the tooth substance as well as she would ecchymoma in other tissues; but thought it a hopeless task to undertake the "restoration" of such a tooth, if by long continuance its reddish color had become "set." Thought in such cases occurring in anterior teeth and producing an unsightly appearance, it was the proper course to either excise and pivot upon the root, or excavate all the discolored dentine and fill the shell with osteo-dentine, thus giving a whitened appearance, and cap that filling with gold. Had performed that operation many times with good results. In relation to the second class would say that he had had a great deal of experience in whitening them, extending over a period of ten or twelve years, having rather courted such cases from the commencement of his practice, owing to the success which had attended his father's efforts in that direction, from whom he had early received instructions as to the methods and materials used by him. Would give as concisely as possible his usual treatment, merely stating that every case had its modifications, which any intelligent dentist could readily take cognizance of, and properly care for. When a tooth presented which belonged to his second class, he drilled into and washed out the pulp cavity if it were not open, and thoroughly cleansed and carefully stopped the opening if it were open, treating it *at first* as an ordinary case of entire exposure and dead pulp. After having gotten the tooth into condition to fill, with the sole exception of its yet being discolored, he dried out the cavity and canal, and carefully introduced a small pledget of cotton, saturated with sol. gum sandarach, into the canal, passing it as well up as possible; this was for the purpose of preventing the passage or exfiltration of foreign substance through the apicial foramen. He then filled the interior of the tooth compactly with dry creta. preparata. pulv.; this was done by means of a sort of funnel or director, and a curved rammer, like a large-sized nerve-plugger, and the failure or success of the treatment depended very much upon the thoroughness of the packing. After a sufficient quantity had been introduced, he stopped the external cavity with a gum and cotton plug, *effectually excluding all moisture.* After allowing this to remain for three or four days it was removed, the tooth washed out, dried, and again filled with the same. Would here remark, *en passant,* that before anything was done to such teeth, a matching "shade tooth" of porcelain should be selected, shown to the patient by the mirror, and placed aside for reference. These applications should be renewed at intervals of from two days to a week, until the desired color was *almost* obtained, generally requiring from two weeks to three months, according to darkness of shade or length of its duration; and when that consummation was arrived at, he then applied dry chloride of lime in the same manner, allowing it to remain from one to five or six hours, producing a whiter shade than natural. When the tooth was plugged with gold, the yellowness of the metal gave that slight tinge which, with undue whiteness, lent brilliancy and "life," such as could be obtained in no other way that he was aware of. Had used, in several cases where pulps had been destroyed by nitrate of silver, and teeth stained in consequence, the cyanide of potassium. Had also used sulph. ether, Labarraque's solution, aqua ammonia, chloride of sodium, etc., with varied results in particular cases; but found the most dependence to be placed upon the method and materials substantially described. Thought that, in cases where rapidly acting "bleachers" had been used, he had seen much return of discoloration, and thought it attributable to the disintegrating effect of substances used, rendering the tooth substance more permeable to discoloring fluids. Theorized that the chalk acted to absorb, as it were, the objectionable agents present in the dentinal structure much as it did spots of grease, etc., upon fabrics of silk or woolen manufacture. Advocated strongly, as the result of observation, the slow or gradual restoration to proper shade as most likely to insure permanence; and stated that, in between one and two hundred cases treated, he had as yet met but three which had not afforded sufficiently compensating improvement to amply repay all time, trouble, and expense. These were cases of thoroughly stained teeth, both in dentinal and enamel structure.

Dr. Fitch thought that the carbonate of lime in the form of chalk, mentioned by the previous speaker, is not, strictly speaking, a bleacher. Regarded it as acting upon the tooth in one of two ways: either as a desiccant, extracting all fluids whether of air, oily nature, or otherwise, from the tubular structure of the dentine, or itself being impacted in the tubuli, thus giving the tooth a whitened appearance.

Color being a reflection and not an entity, he could thus conceive how chalk, in some instances, may be employed, securing very satisfactory results. Yet, as stated, its results must be slow and tedious, occupying many weeks and even months for an exhibition of color simulating original complexion, and not unfrequently must severely try, if not exhaust, the patience of all parties concerned. As a claim had been urged for the use of chalk, that teeth thus treated seldom, if ever, returned to abnormal complexion, and an intimation given that it might possibly be owing to some peculiar property possessed by the chalk, he would not question the fact stated, but doubted very much that this result was in the least due to any specific influence exerted by the chalk; but, on the other hand, thought it more probably due to the circumstance that the *time* elapsing from the commencement of treatment to the final filling of the tooth was sufficient for the *vis natura* (the tooth being freed of local irritants) to restore it and its surroundings to health. Also in an important sense, thought it due to the thorough manner which is usually, or should be, pursued in such cases, in subsequently filling the fangs and cavity of the tooth. He had long entertained the idea that a tooth having been restored to its original color would, unless its fangs and crown were very perfectly filled, soon take on diseased action and exhibit again its abnormal complexion.

Allowing that a tooth is restored to normal condition, or as nearly so as it is possible, the perfection of filling just alluded to is, very probably, the main reason, (outside of constitutional vicious tendencies,) preventing subsequent disease and consequent return to coloration, rather than to any agent employed in bleaching; unless, indeed, the bleacher has contributed in some sense to the restoration of the organ to health; but thought this could not be claimed for chalk. It did, however, possess properties which commended itself to the dentist under certain conditions for experiment and trial, and one of these, and not the least, was its harmless nature.

As to the causticity of chlorinated lime, he must still consider that a solution sufficiently strong for bleaching purposes is not deleterious to tooth structure. After exposing teeth to the action of this agent for two months or more without the least perceptible disorganizing effect, and after a subsequent analysis of such teeth by chemical tests, he was forced to this conclusion. In one instance, after a long exposure to a very concentrated solution, the organic matter in the cementum at the point of the root was removed. Did not doubt but that if a tooth were placed in chlorinated lime and left there sufficiently long, it would be deprived of its organic elements; but this did not militate against its use in the least as a bleacher when employed in a suitable solution, or even in a concentrated form, if the length of time in exposing a tooth to its action is properly regarded. Would not advocate, but on the other hand condemn, the rapid treatment and filling of this class of teeth. Sufficient time must be taken for a restoration of the tooth to health, if a satisfactory result is subsequently expected. The simple fact and only reason that a bleaching agent acts rapidly, ought not to be sufficient cause to discard its use, but, contrariwise, should be the strongest argument that could be urged for its use. Had no doubt but that the cyanide of potassium would remove or neutralize the stains arising from the oxide of mercury, silver, iron, tin, etc., yet thought its use very hazardous, it being a very active poison, therefore would not employ it.

Dr. Flagg said that in regard to theories as to how the hematin came in the tubuli, whether in blood corpuscles or as the result of rupture of these little disks, he conceived it to be of no practical moment as to the present question, but at the same time adopted, as the simplest solution, the rupture which we know to exist in other effusions; thought that the sol. of chlo. lime was exceedingly rubefacient if not caustic, and spoke of its disintegrating effect upon osseous tissue, and of the analogy existing between the constituents of that tissue and the teeth. Referred again to the importance of first getting teeth into condition for plugging, before attempting their restoration to color, and of constantly guarding against any irritation which might from any cause supervene during the process, by all requisite local and constitutional treatment.

Dr. McQuillen remarked that he was disposed to regard the chloride of lime as a caustic.* He was led to this inference by some experiments performed recently with Labarraque's solution, in which a number of teeth, that had been placed in the solution for a day or two, were considerably disorganized ; and he had every reason to believe that the same result would supervene on subjecting teeth to the chloride of lime of equal strength. Possessing such qualities, these agents, if used at all, should be with very great care, as there was great danger of destroying the structure of the tooth in the effort to improve its color. After some remarks in relation to the propriety and advantage of theoretical deductions, he directed attention to the discoloration of the teeth that frequently attends a severe attack of jaundice, becoming frequently as yellow as saffron, and retaining that color, or assuming a much darker shade.

In his efforts to improve the color of teeth he had met with little or no success. He had been very much interested and edified, however, by the remarks of Dr. Flagg this evening, and should make renewed efforts, to be followed, he trusted, by more favorable results.

Dr. Buckingham said, the only advantage he could see from the use of chalk was, that it would absorb the oily matters present in the tooth, and, in this way, was doubtless beneficial. Chlorinated lime, on the other hand, possesses powerful bleaching properties. When perfectly saturated with chlorine it dissolves almost entirely in water, but, as ordinarily prepared, a large proportion is insoluble, consisting of hydrate of lime. It is incompatible with the mineral acids, with carbonic acid, and the alkaline carbonates. The acids evolve chlorine copiously, and the alkaline carbonates cause a precipitate of the carbonate of lime. Chlorinated lime acts as a powerful oxidizing agent, the oxygen being derived from decomposed water, the hydrogen of which unites with the chlorine to form muriatic acid. It has a powerful action also on organic matters, converting sugar, starch, cotton, linen, and similar substances into formic acid, which unites with the lime. It possesses the property, also, of preventing or arresting animal or vegetable putrefaction, and, perhaps, of destroying pestilential and infectious miasms. He thought a solution, sufficiently strong to bleach a tooth, would be very apt to affect, objectionably, the healthy tooth structure.

Cyanide of potassium would be found useful to remove the metallic stains in a tooth from old amalgam or tin fillings.

"THE COMPARATIVE ANATOMY OF THE TEETH"

was selected as a subject for consideration.

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* *Caustics.*—Bodies which have the property of causticity, and which, consequently, burn or disorganize animal substances.—*Dunglison's Medical Dictionary.*

THE AMERICAN DENTAL CONVENTION TO BE HELD AT TRENTON FALLS, N. Y.

The following was reported by the Executive Committee at New Haven as the Order of Business for the American Dental Convention, to be held at Trenton Falls, N. Y., August, 1862.

1. Admission of Members.
2. Reading Minutes of the last Convention.
3. Report of Officers and Committees.
4. Election of Officers.
5. Retiring President's Address.
6. Induction of Officers.

All essays shall be read to open the discussions on the subjects to which they relate.

No member shall speak more than ten minutes, nor more than twice on the same subject, without permission.

I. *Miscellaneous Subjects.*—1. Anæsthetics: their use and relative value. 2. Alveolar Abscess. 3. The causes influencing an abnormal development of the teeth.

II. *Operative Dentistry.*—1. Filling teeth: simple and complicated cavities. 2. The dental pulp: its varied treatment. 3. The extraction of teeth.

III. *Mechanical Dentistry.*—1. Artificial dentures: temporary and permanent.

IV. *Unfinished Business.*

N.B.—The Executive Committee suggests that half an hour every morning be devoted to the presentation of models, improvements, and inventions, and the disposal of business not embodied in the regular order.

Notice.—The undersigned, appointed a Committee by the American Dental Convention at New Haven, at its session in August, 1861, to correspond with the Government in regard to so modifying the Medical service in the United States *army* and *navy* as to admit Surgeon Dentists into the department, will be glad to receive any information or suggestions relative thereto from members of the Medical or Dental professions, or others who may feel an interest in this important movement for the benefit of our volunteers, and others engaged in the defense of our common Country, its Constitution, and Laws.

Dr. W. H. Atkinson, New York City,
" Geo. H. Perine, " " "
" B. W. Franklin, " " " } *Committee.*
" J. D. White, Philadelphia, Pa.
" I. J. Wetherbee, Boston, Mass.

MICHIGAN DENTAL ASSOCIATION.

The Seventh Annual Meeting of the Michigan Dental Association will be held in the City of Detroit, on Tuesday, the 7th day of January next, commencing at seven o'clock P.M.

It is desirable that every member should be present, as business of great importance will come before the Association. This Session cannot fail to be one of interest, as it is expected that those appointed to prepare Essays will be present; the subjects of which, being of vital importance to the profession, it is hoped the coming meeting will result in more good to the Association than any that has preceded it.

Yours, very respectfully, J. A. HARRIS,
Corresponding Secretary.

Pontiac, December 9, 1861.

CENTRAL SOCIETY OF GERMAN DENTISTS.

An association has been in existence about two years bearing this name. At the last annual meeting held at Dresden, August 29, 1861, some fifty members of the dental profession were present; the meeting is described as having been characterized by a marked unanimity of feeling.

Various subjects were discussed; "filling of teeth," treatment of sensitive dentine, exposed pulps, the vulcanite material, etc. "That which tended specially to increase the interest of this year's meeting was the introduction of practical demonstrations, by which the subjects discussed were made apparent, so that it really acquired the character of a school of practitioners; and if this course, which met with such general approval, be pursued further, the Annual Meeting of the Central Society of German Dentists may very soon be changed into a school of practical dentistry."

"In this manner, the various methods of filling teeth with gold were practically demonstrated on patients by Hrn. Döbbelin, of Königsberg, Garke, of Charlestown, Heider, of Vienna, and Zeidsmann, of Frankfort; each of the gentlemen named being surrounded by colleagues who followed the separate stages of the operation with marked attention."

"Vienna was selected for the next annual meeting."

EDITORIAL.

ARSENIC.

Objection is made to the use of arsenic, that it may permeate to the pulp and destroy it—if not in a few days, it will eventually do so; that all teeth which have been treated with it for sensitive dentine ultimately die. This is not true, except when too much is used. I saw some teeth a few days since which had been treated with arsenic twenty-three years ago last March, and those were not dead yet; if the arsenic be left too long in some teeth, of course it will do harm. Any other poison will produce the same results if it be persevered in, and proportionate to its concentration, it is a mere question of time then and care which makes the difference in consequences. If operators are not, in a certain degree, sure of their diagnosis with regard to the condition of a tooth, they had better not use arsenic. I am in the habit of often testing a tooth with simple creosote, a day or two, or chloride of zinc combined with the creosote, before applying arsenic, if I am not sure of the precise condition of a tooth, or of the impressibility of a patient to arsenic. It is remarkable how differently patients, or teeth, if I may so speak, are affected by it. I recollect two young ladies of a family who were brought to me about four years since; a number of their teeth had been plugged by a dentist of distinction about one year previously; but few of the plugs remained, some of them only stayed in the teeth from one to three months. They had suffered so much while getting the plugs inserted that they protested against ever having the operations performed again; but after great solicitation on the part of their parents, and the assurance by friends in whom they had confidence that I could plug the teeth without pain, they consented to call on me. I am quite sure that I never saw patients of their age more nervous and timid than they were. Instead of the dentist having trained those patients *in* to bearing pain, he had trained them *out* of bearing it; this training in is a thing which cannot be done by *force,* and I believe there is a weak point here in the practice of many otherwise good men. I found some of the teeth so sensitive that it was apparently impossible to wipe them dry with cotton. I placed in a few of the cavities some creosote, but in a few days I found that it was of no use, consequently I applied arsenic. I let it remain twenty-four hours, and to my surprise the teeth were as sensitive as ever; I applied it again and again for *ten or twelve times* before I could thoroughly remove the decay; but some days I could remove a little of it while the treatment was going on. These are not rare cases by any means. These patients were of the nervo-sanguine temperament, light-blue eyes and light hair. I do not think any of the pulps have become dead yet in those teeth; there have been no teeth lost since. But, what is of the greatest importance, the patients have become indifferent to dental operations, have no nervousness about them at all; they have gained confidence, and can bear a good deal of pain when it is required. Now, in such extreme cases, which is best—to lose the teeth by "default" by indifferent plugging, or take the risk of losing some of them by a sure method of saving some? In those two patients none have yet been lost by the use of arsenic; but I have lost teeth by attempting to treat them with arsenic in others: still I do not see how I could have saved them. Those cases are few and far between, because if a pulp does become inflamed, it can be treated as an exposed pulp. I might remark here, that I often find that the teeth of some patients are never comfortable after considerable decay has set in until the pulps are destroyed; but I do not state this as an apology for the use of arsenic. I do not often use the arsenic combined with creosote for sensitive dentine: the arsenic is sparingly dissolved in the fluids of the mouth, and on that account I suppose it acts more locally, while the creosote, holding a considerable amount in solution, but not sufficient to kill the part in a short time, is carried into the tooth, inflames it, or exalts its sensibility, so that pain is still experienced from the cut of the instrument; and subsequent applications do no good until the teeth are completely saturated or killed by the arsenic. There does not seem to be enough arsenic in solution in the creosote to kill sensitive dentine, and the irritation it induces prevents the arsenic which is not in solution *actually* from acting. Perhaps I may get at the point I mean by saying that if a part, either sensitive dentine or tooth pulp, be irritated by arsenic, it will not yield to a greater quantity or stronger solution until the irritation consequent upon it subsides, and the parts return to a normal condition again. I believe at this point arises all the difficulties in the use of arsenic about the teeth. If I have failed to make myself understood, let me have the explanation; the facts as I give them are true. J. D. W.

(To be continued.)

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

THE VULCANITE—NOVEMBER.

"REVIEW OF DR. J. H. MCQUILLEN'S 'REVIEW' OF THE MUSCLES CONCERNED IN THE DEPRESSION OF THE LOWER JAW. By T. H. BURRAS, M.D., New York. *Muscles concerned in Depressing the Jaw.*—'The only muscle that acts as a depressor of the jaw is the digastricus. The origin, insertion, direction, and pulley-like attachments are beautifully adapted for the performance of this office.'

"This little parergy seems to have stirred up my much-esteemed friend, Dr. McQuillen, of the DENTAL COSMOS. On first glancing over the review the professor has pleased to favor me with, I supposed I had either arrived at the age of old fogyism, or that new discoveries had been made of muscles, and their uses, that I had not been properly posted in, for it is now some thirty years since I have handled either tenaculum or scalpel for the purpose of dissection. * * *

"I am at least very much obliged to the doctor for more influence and efficiency of my much-favored muscle than ever I dared to honor it with, when he says, 'In addition to assisting the muscles named in depressing the lower jaw, or elevating the os hyoides, according as the one or the other is made a fixed point, the digastric opens the mouth even when the lower jaw is fixed.' Now, when the lower jaw is fixed by the combined voluntary action of the temporal, masseter, and pterygoid muscles, how the digastric or any and all the other muscles which are *inserted* into the os hyoides, can open the mouth, is more than any physiologist has ever credited them with, and more influence than they really do possess."

In connection with the above extract from an article of some length by Dr. Burras, we would take occasion to remark that although not enjoying the honor of a personal acquaintance with him, we have been informed that he is an estimable gentleman and a highly respectable practitioner. Knowing nothing of the manner, or at what period he prosecuted his studies, as silence is said to give consent, we felt impelled a short time back, in the simple discharge of a duty which we owe this magazine, to take exceptions to a view presented in its pages at variance with our own convictions, and the opinions entertained and advanced by anatomists and physiologists generally.

As in the present article he still maintains that the digastric muscle is the only depressor of the lower jaw, we have deemed it advisable to present the views of some of the most reliable authorities in anatomy and physiology at the *present day* on this subject.

Thus Cruveilhier, the celebrated French anatomist, classifies "the digastricus, stylo hyoideus, mylo hyoideus, and genio hyoideus," as the "muscles of the supra hyoid region."

"ACTIONS.—These are of two kinds, relating to the *depression of the lower jaw* and to the elevation of the os hyoides.

"The os hyoides being fixed to the muscles of the sub-hyoid region, (the sterno hyoideus, omo hyoideus, sterno thyroideus, thyro hyoideus,) *all* the supra hyoid muscles, with the exception of the stylo hyoideus, *depress the lower jaw;* and it should be observed that they are situated in the most favorable manner for this purpose; for on the one hand, they are almost perpendicular to the lever, and on the other, they are attached as far as possible from the fulcrum. The obliquity of their direction has also this advantage, that the lower jaw is carried backward as well as depressed, and thus the orifice of the mouth is greatly increased in size."—pp. 228, 229.

Gray, the latest and best authority on anatomy, makes the following classification:—

"ELEVATORS OF THE OS HYOIDES—DEPRESSORS OF THE LOWER JAW. Digastricus, mylo hyoid, stylo hyoid, genio hyoid.

"ACTIONS.—This group of muscles performs two very important actions. They raise the hyoid bone, and with it the base of the tongue, during the act of deglutition, or when the hyoid bone is fixed by its depressors and those of the larynx, *they depress the lower jaw.*"—pp. 207, 208. Philadelphia, 1859.

Erasmus Wilson, whose work is a text-book in every medical college in Great Britain and America, speaking of the same muscles, says:

"The whole of this group of muscles acts on the os hyoides when the lower jaw is closed, and *on the lower jaw* when the os hyoides is drawn downward and fixed by the depressors of the os hyoides and larynx."—p. 191. Philadelphia, 1859.

Professor Dunglison, whose works have a larger circulation than any other medical writer in the country, says, in his Human Physiology:

> "The articulation of the lower jaw is of such a nature as to admit of depression and elevation; of horizontal motion forward, backward, and laterally; and of a semi-rotation upon one of its condyles. The muscles that move it may be thrown into two classes—*elevators* and *depressors.* These, by a combination of their contraction, can produce every intermediate movement between elevation and depression. The raisers or levator muscles of the jaw extend from the cranium and upper jaw to the lower. They are four in number on each side: the *temporal* and *masseter*, which are entirely concerned in the function; the *external pterygoid*, which, while it raises the jaw, carries it at the same time forward, and to one side; and the *internal pterygoid*, which, according as it unites its action with the temporal or with the external pterygoid, is an elevator of the jaw or a lateral motor. The depressors may be divided into immediate and mediate, according as they are, or are not, attached to the lower jaw itself. There are only three of the former class: 1, the *digastricus*, the anterior fasciculus of which, or that which passes from the os hyoides to the lower jaw, depresses the latter; 2, the *genio-hyoideus;* and 3, the *mylo-hyoideus*, all of which concur in the formation of the floor of the mouth. The indirect or mediate depressors are all those that are situate between the trunk and the lower jaw, without being directly attached to the latter: as the *sterno-hyoideus*, the *thyro-hyoideus*, the *sterno-thyroideus*, and the *omo-hyoideus;* the names of which indicate their origin and insertion. *These, in the aggregate, form a muscular chain*, which, when it makes the trunk its fixed point, *depresses the lower jaw.* The arrangement of the elevators and depressors is such that the former predominate over the latter: and hence during sleep the jaws continue applied to each other, and the mouth is consequently closed."—*Human Physiology*, p. 75. 1856.

In addition to the above extracts from works in our possession, we are indebted to the courtesy of Professor Dunglison for the following extracts from works in his valuable and extensive library.

Speaking of the depressors of the lower jaw, Budge says: "The most important muscle thereto is the digastricus, with which are associated the genio and mylo hyoideus."—*Lehrbuch der speciellen Physiologie des Menschen.* S. 154. Weimar, 1860.

Longet says: "The *digastricus is not the only depressor;* the greater part of the supra-hyoid muscles and the platysma-myoides concur in the movement whenever force has to be exerted."—*Traité de Physiologie,* i., 99. Paris, 1857.

Beclard remarks: "The depressors of the lower jaw are the anterior belly of the digastricus, the genio-hyoid and the mylo-hyoid muscles which are attached on the one hand to the lower jaw, and on the other to the os hyoides."—*Traité Élémentaire de Physiologie humaine*, p. 48. Paris, 1855.

Many other authors might be quoted, but we prefer to present those who are recognized as the most reliable and authentic at the present day.

In the extract presented, Dr. Burras quoted a statement of ours "that the digastric opens the mouth even when the lower jaw is fixed;" and remarked—"How the digastric or any and all the muscles *inserted* into the os hyoides can open the mouth, is more than any physiologist has credited them with, and more influence than they really do possess."

To this we would respond that the words *origin* and *insertion* are employed by anatomists as conventional terms. Thus origin is generally applied to the more fixed or central attachment, or to the point toward which the motion is directed; while *insertion* is assigned to the more movable point, or to that most distant from the centre; but there are exceptions to this principle, and as many muscles pull equally toward both extremities according as one or the other is made a fixed point, the use of such terms must be and are regarded as arbitrary, and in no part of the body is this more markedly the case than in the supra-hyoid group of muscles

The digastricus in particular, on a careful dissection, is found to consist of two fleshy bellies united by an intermediate tendon, and is curved upon itself, forming the arc of a circle, with the concavity directed upward. Employing the terms *origin* and *insertion* with the qualifications indicated above, it is invariably described by *practical* anatomists as *arising* from the digastric fossa of the mastoid process of the temporal bone—passing downward and forward, piercing the stylo-hyoideus muscle, then curving forward and upward, to be inserted into a depression on the inner side of the lower jaw near the symphysis. In addition to perforating the stylo-hyoid muscle, the tendinous portion of the digastricus is connected with the os hyoides by an aponeurotic loop, lubricated by a synovial membrane, and in which it plays as through a pulley. A strong plane of fascia is formed between the anterior bellies of the muscles of each side by thin layers of aponeurosis given off from the tendons and connected with the body of the os hyoides. This fascia, named the *supra hyoidean*, is continuous with the deep cervical fascia.

Now when the *mouth*—we mean the orifice formed by the lips—is closed, and the jaws held firmly together by the *elevator* muscles, the temporal, masseter and pterygoid, it will be found that the lips can be separated by a forcible contraction of the digastricus, aided of course by the muscles of the supra and infra hyoid group and the platysma myoides; the direct action on the lips being through the facial muscles or muscles of expression.

There is no position more untenable in anatomy indeed than that which singles out one muscle from a group, and accords to it an action independent of all others, for under such circumstances there is invariably an association of movement and a dependence each upon the others.' This is what we object to on the part of Dr. B., and, of course, have no desire to be understood as maintaining such a position on our own part. If such an inference has been formed from any statement of ours, we gladly take advantage of the opportunity to correct such an impression.

In conclusion, we would remark that in professional discussions it is far more important that writers should feel solicitious to have their opinions correctly and properly presented, than desirous of amusing their readers by indulging in facetious efforts. The latter may beguile some; but if the former is neglected, it will disappoint, if it does not disgust all.

We are led to make this remark by observing such terms as sphenter, *steno hyod*, *petigoid*, *omo genio*, and *thyrio hyoid*, and other mistakes of a similar character, scattered throughout the article. Having no desire to take an ungenerous advantage of a writer, we take pleasure in stating that these errors are without doubt due to carelessness or ignorance on the part of the printer and proof-reader. To protect themselves, however, from such mistakes and the undesirable impression created in the minds of educated readers under such circumstances, writers should invariably insist upon examining the proof-sheets of their communications. Even then, after exercising the greatest care, typographical errors will sometimes occur, though they are not likely to be as numerous or as gross as without it.

BARON LARREY. AN INTRODUCTORY LECTURE. BY D. HAYES AGNEW, M.D.—We are indebted to Dr. Agnew for a copy of the most exhaustive sketch presented in the "English language of the life of one whose name stands among military surgeons where Napoleon's stands among generals—*the first and the greatest.*" Having listened with pleasure to the delivery of the lecture, we have derived additional satisfaction from its perusal. In selecting such a subject as the theme for an introductory lecture at a period when so many young men are preparing themselves for the arduous and responsible duties of army surgeons, Dr. Agnew has evinced his usual discretion and judgment, for a more worthy object of admiration and emulation could not be presented. As an earnest and indefatigable student, a humane and devoted practitioner, a brave and high-toned man, Baron Larrey's name will always be referred to with satisfaction and pride as the highest type of a military surgeon.

THE CINCINNATI LANCET AND OBSERVER—DECEMBER.

"PRESERVATION OF THE TEETH.—In a paper read before the New York Dental Association, Dr. Franklin cited some highly interesting observations on saliva, made by Dr. Samuel Wright, of Edinburgh. Saliva is always denser after a meal than before it, in the evening than early in the day. It is commonly thickened by an abundant use of animal diet, by fatty food, and by oily fish. All alcoholic stimulants have a tendency to thicken the saliva, and in large quantities they not only alter its consistency but materially diminish its activity. Alkalinity is essential to the proper performance of the physiological function of the saliva. The quantity of alkalies varies considerably, but if it exceeds one per cent., it indicates disease. The alkalies are increased in quantity during digestion, diminished in fasting, which sometimes renders the saliva acid. When, from any cause, the reaction is acid, spirits or pepper should be taken into the mouth, under the stimulus of which, in a healthy person, the quantity of alkali is always very much increased. This is always the case when the discharge is copious—for instance, from chewing tobacco or during meals; smoking tobacco diminishes the quantity of alkali. Dr. Wright enumerates the following salivary diseases: deficient, redundant, fatty, sweet, albuminous, bilious, alkaline, fixed and ammoniacal, calcareous, saline, puriform, fetid, acrid, colored, frothy, urinary, gelatinous, and milky saliva. In each of these conditions the saliva is more or less deficient in its normal elements, and in some of them highly destructive to the teeth, the most so when acid. Piggot says 'the acids with which saliva is at present known to be contaminated are the acetic, lactic, hydrochloric, oxalic, and uric. Acid saliva may have a sour or an exaggerated salivary odor, both of which are increased by heat. It reddens litmus-paper with greater or less intensity.' Dr. Franklin adds, that a superior test-paper may be prepared by bruising dahlias and extracting the coloring matter with alcohol, wetting paper with the infusion and drying it. This paper turns green by the action of alkalies, remains blue in neutral solutions, and becomes red in acid.

"The saliva is impregnated with lactic acid chiefly in gout, rheumatism, ague and fever, diabetes; with acetic acid in scrofula, scorbutus, small-pox, protracted indigestion; with muriatic acid in simple gastric derangement, and from immoderate use of animal food; with uric acid in gouty affections. The presence of oxalic acid depends most likely upon depraved digestion or imperfect assimilation. Acidity of the saliva is also apt to occur in various other disorders, as in typhoid and inflammatory fevers, measles, consumption, protracted venereal diseases, rickets, catarrh, mumps, quinsy, cancer of any part of the digestive apparatus, worms, and tedious dentition of weakly or scrofulous children. As an internal remedy for the correction of acid saliva, the carbonate of soda is preferable; merely taken into the mouth, all alkaline salts neutralize for a time the acidity of the secretions. Friction of the gums with simply brush and water produces for a time a strong alkaline reaction."—*New York Dental Journal.*

LONDON DENTAL REVIEW—OCTOBER.

"CROUPY INFLAMMATION IN THE MARGIN OF THE GUMS, AND ITS EFFECTS BY DR. STEINBERGER, of Vienna. Translated by GEORGE HENRY, M.C.D.E.—Croupy inflammation of the gums is simply referred to by most authors, in their description of diseases of the mucous membrane of the mouth and throat, as 'diphtheritis membranacea;' and it is apparently regarded by the practical surgeon as of less importance than when it attacks the throat, because he does not see in it so much danger to the life of the individual: and yet it merits special consideration, as well for its primary appearance in the margin of the gums, as for its morbid consequences, which may involve neighboring osseous structures, as the alveolar processes, or the jaw-bone itself. This disease is of special importance to the practical surgeon, who attends particularly to diseases of children, because it often assumes an epidemic form after scarlet fever and other eruptive diseases in hospitals for children, and even in large families: it is of equal moment to the dentist, who is mostly called upon to treat it in its later stages, when it has produced loosening of the teeth, degeneration of the alveoli, or necrosis of the jaw-bone. When the disease occurs in adults, the dentist often meets with it in its earlier stage, the patient being induced to consult him, partly owing to pain, partly to the fetid odor arising from the affection, which is a burden to his existence.

"The disease presents itself under the following appearances: The gum is inflamed, somewhat swollen, and very painful, and prone to bleed on being touched. In its early stage, the margin of the gums is found to be covered with a pale-gray, structureless membranous exudation, scarcely half a line in thickness, which sloughs off in flakes. The mucous membrane beneath is deprived of its epithelium, very vascular, and bleeds readily. The formation of the exudation commences generally externally, *i.e.* on the labial and buccal portions of the gum of the lower jaw, and often first at its boundary with the lower incisors, whence it gradually progresses until the margin of the gums is completely involved. The gums of the lower and upper jaws are seldom attacked at the same time.

"The exudation takes place rapidly, often in a few hours, not seldom in the course of a night; it is accompanied with a very painful sensation, described by the patient as a drawing pain: this is increased by stopping in warm places or in bed. Feverish appearances are slight, often scarcely perceptible.

"As soon as the exudation is formed, it sloughs away in an ill-smelling, ichorous mass, which corrodes the mucous membrane beneath, producing an ulcerated surface. Not unfrequently, the mucous membrane of the cheeks lying on the teeth and diseased gums is covered to a great extent with this exudation, as also the border and under surface of the tongue. An inflammatory action is likewise set up in the lining membrane of the alveoli, through the ichorous discharge; it becomes strongly injected, swollen, and covered with exudation, which, after sloughing in the alveoli, particularly in those of the lower jaw, is retained, as it were, in a reservoir. The teeth become loose through the swelling of the periosteum, appearing longer to the patient; and through the continued presence of the corroding ichor, the periosteum is destroyed, and the teeth, being disconnected with the jaw, either fall out of themselves or are readily removed.

"When the periosteum is destroyed, this exerts its corrosive power on the bones, which become infiltrated with the fluid, carious in larger or smaller portions, and finally necrosed. In the almost epidemic cases of croupy gums occurring in the Hospital for Children last year, the opportunity presented itself for observing several cases, in which the alveolar processes had so disappeared that in children of from four to six years of age, after the primary teeth had fallen out, the germs of the developing permanent teeth were exposed to view.

"In the upper jaw, the destroying process does not proceed to such a depth as in the lower jaw, because the ichorous matter, being heavy, has a tendency to sink downward, and thus considerably facilitates the cleansing of the parts; while, in the lower jaw, the decomposing fluid is retained in the alveoli and in the porous bones, thereby greatly favoring the extension of the disease. Frequently, necrosed portions of the alveolar process, an inch in length, are exfoliated. Necrosis does not always proceed from the alveolar border downward; but the gums may be destroyed, and the anterior bony wall die away, leaving the dental germs exposed.

"This disease occurs more frequently in children than in adults, and more often in those who have lately recovered from tedious illnesses—as scarlet fever, measles, and typhus—than in those who are otherwise quite healthy.

"A chilly, damp dwelling is commonly an exciting cause, or exposure to a cold, damp draught: the latter is often the sole cause of such disease in healthy and often strong men, as travelers, or those engaged in business in wet localities. The disease only assumes an epidemic character in hospitals for children. This appears to arise partly from immediate contagion, through the transmission of the exudation from one child to another by means of various articles in use, and partly also from the weakness which follows long-continued illness. Sometimes a peculiar tendency does not appear to lie in any definite external circumstances; for it is a fact that, in the sick-chambers set apart for these patients, their number will not diminish for several weeks together, but recruits are constantly added from other wards, while the earlier patients have long since been dismissed as cured.

"The duration of this disease is dependent on its extent, especially on the stage in which treatment is first resorted to, and, further, on the general state of the patient's health. Its effects are generally more lasting and destructive when it succeeds a previous illness than when occurring in healthy individuals. Slight cases are curable in from eight to fourteen days, the more severe requiring often several months.

"*Treatment.*—As croupy inflammation of the gums exerts its hurtful effects particularly through the lengthened presence of the ichorous product discharged from its generating source on the surrounding parts, the first thing suggesting itself as favorable to a cure is extremely careful cleansing. The best plan is carefully to remove the exudation before it is thrown off. This is readily effected, and that without giving much pain, by removing the exudation, especially from between the teeth, with a dossil of lint held with an instrument. This done, the ulcerated surface is cleansed from blood by syringing with warm water: a little alum may be added when the hæmorrhage is excessive. When the mucous membrane is thus cleansed, the wounded surface should be touched with caustic, not forgetting to apply it well between the teeth. In the interim, the patient should frequently take warm mucilaginous decoctions in the mouth, which should be a cleansing and soothing kind; and the cauterizing must be repeated so long as any new exudation is formed.

"As this disease calls for direct treatment, which is very often refused, especially by children, because it is accompanied with pain, and the nurse, and often even the doctor, avoids the patient, on account of the dreadful fetor, very neglected cases of this kind are constantly received for treatment. An ill-smelling fluid, a mixture of saliva and ichor, flows from the mouth; the lips and inferior maxillary glands are swollen; the otherwise indolent patient announces his approach to the doctor in tears and fear of coming pain. In such cases, the mouth should be well syringed with a slightly-aromatized warm fluid, in order to remove all loose matter. The patient, who feels an immediate benefit from this cleansing, soon endeavors to open his mouth, when all loose flakes of exudation can be removed, and the state of the teeth ascertained. If the teeth are found to be very loose, and ichorous matter flowing from the alveoli, the teeth must be removed, especially if they are carious, or, as is often the case in children, the roots are exposed.

"If any necrosed portions of bone are discovered, they should be removed at once. After checking the hæmorrhage, the ulcerated portions should be cauterized.

"Besides this local treatment, the 'general' is confined to change of air, and, in the convalescent, a liberal diet. By careful attention to this method of treatment, no trouble being spared, the disease can be cured, and its effects limited; though a great extension of the disease in weak persons, particularly in neglected children, may terminate in death through absolute exhaustion."

THE DENTAL REVIEW, LONDON—NOVEMBER.

"ON A CASE IN WHICH THE FULLY-DEVELOPED CROWN OF A MILK TOOTH RECEDED INTO THE JAW. Observed by HR. HUMM, Practical Dentist at Altona in Holstein.—The subject of this case is a little girl, now two and a half years of age. The first dentition was completed with her second year, all the teeth having appeared at the proper time and in regular order.

"At the age of fifteen months, the crown of the right central incisor began to recede; and at the present time it is covered with the gum, leaving only a small portion of the incisive edge exposed. There is no indication of any swelling; the gum is not inflamed or sore to the touch, nor does the child complain of any pain in the tooth, even when pressure is applied to the small portion of the crown exposed, which is neither loose nor discolored.

"The child, who is pale and sickly in appearance, has been subject to most of the complaints peculiar to childhood, and has suffered particularly from a bad attack of small-pox: she is endowed with an intellect suitable to her age; is lively, and enjoys a good appetite and digestion.

"After giving the above description, Hr. Humm says: 'I must acknowledge that the cause of the receding of the crown of the tooth is not satisfactorily clear to me. If a cessation in the development of the tooth be the cause, then it is very remarkable that none of the other teeth are similarly affected; nor does this hypothesis throw any light upon the receding of the crown.

"'The removal of the root of the tooth by absorption is a more reasonable supposition; yet this is questionable, and the following observations must not be overlooked. Suppose absorption to have taken place, would not the crown become loose and drop out, as by the shedding of the teeth? But in this case it is firmly seated in the jaw, and continues to recede and disappear. Further, would not the crown of the tooth be changed in color, through absorption, which at this tender age would only be ascribed to a pathological process? But this is not the case, for the exposed portion of the tooth is the same in color as the crowns of the remaining teeth; and would not such an occurrence have explained itself, through some appearance or other, such as the presence of small ulcers or slight irritation? That inflammation had been present, does not appear to me to be admissible; and it is unlikely—even incredible—that in the absence of any pain whatever, inflammation could have been so powerful as to open a passage upward for the root of the tooth, whereby, however, the receding, the firmness, and the good color of the tooth would have been easily accounted for; but I cannot admit the correctness of such a conclusion, for the external and internal portions of the jaw and the nose are in a perfectly normal condition, and there has always been an entire freedom from pain.

"'The following has suggested itself to me as being the most probable cause—that of "mechanical influence," as from a blow or a fall, producing a slight inflammation at the root of the tooth, imperceptible to the child, yet sufficient to induce absorption.

"'Through pressure in eating, or biting the finger or any hard substances, the tooth is gradually pressed back into the jaw, in proportion with the progress of the absorption, until at last the mechanical pressure in biting being exerted solely on the gum which has closed over the tooth, the receding process ceases. In this case it is probable that the absorption is checked, and in due time, when the deciduous shall be replaced by the permanent set, the remaining portion of the crown will be shed to make room for its successor.'

"In conclusion, Hr. Humm hopes that, in advancing this explanation, he may not be misunderstood, for he does not say that his view of the case must be a correct one; he also requests that any gentleman who can give a clearer elucidation of it will kindly do so, as the case is certainly one of great interest.

"Hr. Humm finally mentions a similar case communicated to him by Dr. Kranner, of Hamburg, which occurred in the permanent incisor of a girl ten years of age: that gentleman, however, was unable to watch the case, owing to the girl's change of residence."

If the observation of Hr. Humm, a point not distinctly stated, *commenced* with the *eruption* of the *tooth* and continued throughout the appearance of the entire *crown* above the *gum*, and *ultimate recession* of the tooth beneath the gum, he has witnessed a most remarkable phenomenon. If, however, the greater part of his statement is dependent upon the testimony of the mother and nurse of the child, it is reasonable to infer that, like such witnesses generally, their evidence is not worth much. It is difficult indeed to conceive how a tooth once fully formed can recede into the dense structure of the jaw. To suppose that the tooth settles in the alveolus, as the root is absorbed, is the reverse of what is presented to us as the result of daily observation of the operations of nature, in which, as the root becomes absorbed, it loosens and eventually falls out.

Supposing the greater part of the testimony depends upon the evidence of mother and nurse, the most plausible explanation that suggests itself to our mind is, that there has been an arrest of development—the growth of the tooth having ceased after the cutting edge had pierced the gum. Several instances of this kind have come under our immediate observation, and have been noticed by others.

THE DENTAL REVIEW, LONDON—NOVEMBER.

"CHLOROFORM IN DENTISTRY.—In cases of dentists' operations, chloroform is much used, and with great safety; it affords very marked relief, though as a rule, it is not desirable to push the anæsthetic action as far as complete insensibility; deep narcotism is, indeed, to be avoided, as the patient should be partially conscious, at least as regards the special senses, so as to hear the spoken directions of the operator when he directs the mouth to be opened, the mouth to be washed with water, etc.; such patients will often cry out most terribly, too, especially nervous females; they have the apprehension of pain vividly before them; yet, when asked afterward, they say they felt nothing, they express the utmost amazement that five or six or ten hideous stumps, old enemies, are all out; but such is the fact. As regards the position of the patient, although, perhaps, not very desirable, yet I have administered chloroform so often to persons sitting upright or partly upright in a dentist's chair, that I believe there is not much risk attending it. Snow had six hundred such cases; if faintness occurs, however, the patient should at once be let down on the floor, or placed in a horizontal position, or carried into the open air. M. Velpeau relates an accident (somewhat of the nature of a dentist's case) that is suggestive to dentists; he was called to remove an enlarged tonsil, he chose ether as the anæsthetic, the patient became deeply insensible, blood collected in the mouth and throat, the directions to wash the mouth with water were unheeded, the reflex function of the nerves of the part was extinguished, and the patient was suffocated. In such a case as this the operator must trust almost entirely to the will of the patient, as it is now found that probably some deaths have been hastened by catching the tongue in a forceps to draw it out, or hooking the finger into the pharynx; if the respiratory muscles have stopped, the effect of such is of little use. The vascular membrane lining the pulp cavity of a tooth that is painful is usually intensely sensitive and vascular, though the tooth itself is insensible; here it is desirable to touch the former with a little creosote before extraction, or to allow the patient to wash the mouth first with iced water, or with chloroform and water. It is to be feared that some dentists frighten the patient from having chloroform; they have at their fingers' ends all that has appeared in the journals of the danger of diseased heart, etc.; at the very worst, however, this is not worse than railway accidents. But what should we think of the intellect of a man, dentist or not, who would advise his friends never to enter a railway carriage. A patient should never be frightened, as fear may bring on exactly what is to be avoided. Young patients require less chloroform, or rather they remain longer under it than old patients; they will go off into sleep, too, when released from the agony of an old pain; a fixed stare in such a patient with protrusion of the balls of the eye, with sudden surprise and stoppage of the breath, are always the first signs of danger during the administration—signs of irritable larynx cough, etc. require additional caution also. It is fortunate, as stated previously, that very complete anæsthesia may exist; but still the special senses of seeing, hearing, etc., remain curiously perfect. Patients, too, as if in pain, especially sensitive ladies, will cry most vehemently as teeth are extracted, but they will say afterward that they felt no pain whatever, and when the effect of the chloroform has passed off, they remember nothing of pain. Muscular rigidity of the masseter and other muscles of the lower jaw is very common in dentists' cases. A piece of wood or a screw is usually inserted between the teeth, and answers every purpose very well. If the patient is desired also to open the jaw, if the narcotism be not too deep, he will be found to assist, at least, in doing so, and there is seldom any difficulty on this head."—*Dr. Kidd on "Chloroform."*

The above is presented as the opinion of one who, it will be remembered, has made the fatality attendant upon the administration of chloroform a subject of careful, impartial, and long-continued investigation, and placed on record, in a systematic manner, the number of deaths reported from time to time. Embracing in his researches every department of surgery in which chloroform has been used, major and minor operations in civil and military practice, his opinion is entitled to great respect and consideration.

In Europe, notwithstanding the dangerous character of the agent, chloroform is employed almost to the entire exclusion of ether; while in this country the reverse prevails, ether taking the place of chloroform; very few practitioners of surgery or dentistry being willing to employ an article the exhibition of which they fear may be attended by such unfortunate results. Is this apprehension well grounded, or is it exaggerated? Such is positively asserted to be the case, by European practitioners, and by Dr. Gross in our country. That it is a much more pleasant article to patient and operator than ether, will be generally admitted.

BRITISH JOURNAL OF DENTAL SCIENCE—OCTOBER.

"BRIEF NOTICES OF SOME FEW CASES OF DISEASED TEETH, RECENTLY PRESENTED TO THE MUSEUM OF THE DENTAL HOSPITAL, SOHO SQUARE. By J. L. LEVISON, Esq.—It is patent to all observers that in dental affections, as in all other instances of diseased organs, the report of cases may be useful to the student and aid the more profound practitioner to deduce certain generalizations by which to acquire a more correct knowledge of the laws on which such peculiar conditions depend.

"It is in this spirit that I offer a few particulars for your journal, of some of the diseased teeth and stumps which I propose giving to the museum of the Dental Hospital, Soho Square, through Mr. Underwood.

"Paper marked No. 4 is a compressed fang of a dens sapientia with a dried-up fungous enlargement at its extremity, and which occasioned a pseudo-epileptical form of fit. This was observed after some excessive excitement, and the physician who was first consulted pronounced it to be epilepsy. Each time the attack was coming on she appeared 'spectre-stricken,' but after the removal of the fang all the symptoms ceased, and the lady never had any return of them.

"No. 6 contains some temporary teeth extracted from a young lady, aged 13 or 14. She was a beautiful girl, of a sanguineous-lymphatic temperament, and she inherited a consumptive constitution. This may account for the tardiness of the dental development; for she had in the upper jaw only one permanent lateral incisor, one cuspidatus, and three bicuspids, and in the lower jaw but one cuspidatus and three bicuspids.

"Nos. 10 and 11 are cases of *necrosis* of fangs; one from a blow, and the other from an active inflammation of the periosteum.

"No. 17. Extracted from the mouth of the housekeeper of the Rev.

J. C. The patient was of a nervous temperament and remarkably thin in her person, which condition arose from the constant irritation of these fangs, the cavities of which were obliterated by a bony deposit. She recovered rapidly after their removal.

"No. 19. Three cases in which the inner surfaces of the teeth are ground away by rubbing on the lower incisors, the friction having been greater from the absence of every molar tooth. There was no kind of inconvenience experienced until the pulp cavities became exposed, and then great suffering ensued, which ceased immediately on the removal of the teeth.

"No. 18. A fang of a horny appearance, which induced similar symptoms as in cases of exostosis.

"No. 22. This was a curious case, which was reported at the time in the *Lancet.*

"A young lady lost her voice for many months, and was treated by counter-irritants, tonics, stimulants, and other remedial means, such as cold and warm shower baths alternately, and plunge baths, but without any benefit; and then, as a *dernier ressort,* she was sent to Brighton, where she consulted me. I observed that her teeth were wedged together, particularly those of the lower jaw, and as one of the bicuspid teeth had the appearance of being carious, I removed it, and in a few hours she recovered suddenly her voice; at first the tones were unpleasant, but ultimately they became more normal.*

"No. 23. The upper part of the crown with the entire fangs absorbed. It was removed from the temporal muscle (in which it was deeply imbedded) just at the attachment of the coronoid process. It occasioned extensive facial inflammation and great suppuration of the sub-lingual glands.

"No. 15. Two cases of the 'smoker's disease.'† Each induced the most horrid neuralgic pains.

"No. 21. Ten specimens to illustrate the irritation to the gums and sockets by the contact of sharp, rough surfaces.

"No. 13. An interesting case of oblique fractures of two central incisors, occasioned by a youth who was the 'blind buff' accidentally running his head against his brother's mouth, who was the taller of the two; and from the violence of the blow there was induced the above fracture.

"No. 12. A case illustrating the 'smoker's disease,' in which the extremities of the fangs are absorbed, and the inflammation consequent thereon is attended with darting and most excruciating agony, from the teeth being mere extraneous bodies.

"No. 1. Five teeth to show the different stages of development of the fangs.

"No. 2. A tooth showing the progressive stages of development of the fangs clearly defined.

"No. 14. A remarkable specimen of *exostosis*, the bony tumor being in distinct relief. This tooth was given me when I was in practice in Hull, in the year 1825, by the late Mr. Higson, the house-surgeon of the infirmary of that town. He told me that the patient to whom it belonged was brought to the hospital with an excessive inflammation of the jaw and face, which latter extended to the eye, and subsequently induced active disease of the brain, and ultimately the death of the individual.

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* From this and other cases it is evident that when the teeth are jammed together many morbid phenomena may be observed. In Case 22 the *cordes vocales* seemed to be functionally affected. In other instances a sensation of continued toothache is experienced, and which, in my own practice, I often relieved by simply using a dividing file at the parts where the pressure seemed the greatest.

† Some years since I published, in the "Medical Times and Gazette," a paper on the diseases of teeth induced by smoking.

"These are a few particulars of some of the most interesting of these cases, and, should you deem them worthy of your journal, I shall thank you to insert them.

"My object in sending these cases to the *British Journal of Dental Science* has been merely to suggest to those who may give specimens to the museum of the Dental Hospital, that they should at the same time give a brief history of each, so that their exact value might be estimated for illustrating the different diseases of the teeth, and to distinguish those which are idiopathically affected from those which may sympathetically affect the other organs of the buccal cavity, and in time a collection might be made which would fully illustrate the different diseased conditions of the teeth, including those which more or less may implicate remoter organs by a reflex nervous action."

The course pursued by Mr. Levison is one worthy of commendation and imitation, and every practitioner has it in his power to render similar service to the profession by not only preserving valuable pathological specimens, but also making an accurate record of the history of each case. Deposited in a public institution devoted to the instruction of dental students, such collections become valuable aids in illustration of dental pathology.

Case No. 22, a lower bicuspid, the extraction of which was followed in a very few hours by the restoration of the voice in a young lady who had been deprived of speech for several months, is the only instance of the kind placed on record, and is not merely an unusual, but a very remarkable case.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Lecture on Dentition and its Derangements.* By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics. *Salivation and its Causes; Stomatopharyngitis; Pharyngitis, Chronic and Acute.*—Before leaving altogether the subject of the diseases and affections of the mouth, I desire to add a few remarks on salivation, that is, on the secretion of more saliva than is required by the ingested food or by involuntary deglutition. The secretion of the salivary glands has too long been regarded as a mere filtrating process, from the fact that in proportion to other secretions but few solid elements are contained in it. Thus it was considered as a simple exosmotic process, in which the constitution, velocity, and pressure of the blood, nature of the walls of the blood-vessels and the glands, chemical constitution of the glandular cells, and the influence of the nerves were unknown. Ludwig at last has proven, from experiments on the submaxillary gland, that the influence of the nerves (facial and trigeminus) acts upon the secretion, without any influence of the pressure under which the blood comes into, and flows in, the gland. The same physiologist, and Czermak at the same time, have observed that the secretion is induced by irritation of the sympathetic fibres of the gland itself, and also of the trunk of the sympathetic nerve on the neck; and, what is most wonderful, the latter observer has found that under certain circumstances the irritation of the sympathetic nerves will sometimes stop the secretion brought on by the irritation of the fifth pair.

"The secretion of the salivary glands appears to be under the direct influence of the brain. Bernard produced salivation by irritation of the central end of the dissected lingualis. Direct irritation of the central end of the n. glossopharyngeus has the same effect. The looking at an agreeable dish brings on salivation; so does the thinking of food while hungry, according to the experiments of Frerichs, as is also the case with the introduction into the stomach of common salt, or of food. There is superabundant secretion of saliva in ulceration of the stomach, cancer of the stomach, in the premonitory stage of vomiting, in colic from helminthiasis, in certain stages of pregnancy, in hysteria, and in cases of intermittent and typhoid fever, where we are hardly justified to attribute to salivation any importance as a 'critical' symptom; in tickling the soft palate, in simple masticating movements of the jaws. Thus you see the possibility of salivation occurring on the introduction into the mouth of irritating substances, in cases of surgical diseases of the mouth, wounds, and operations, and of neuralgias in the range of the ramifications of the fifth pair. Thus you perceive, also, that salivation may be produced by the irritation, though slight, of the ramifications of the maxillary nerve, around which the process of the development and protrusion of teeth is going on. At all events, we are not justified in supposing that the contiguity of the mucous membrane, and the transmission of the catarrh of the mouth to the glands, are the only causes of any case of salivation. Even mercury and iodine do not appear to act first on the salivary glands. Iodine is seen in the saliva soon after it has been taken; if direct irritation of the gland was the only cause of salivation, why is it that salivation takes place so late on the administration of iodine? Mercury, too, is soon detected in the saliva, and nevertheless it takes some time before salivation appears. Moreover, the first secretion of salivation in such cases shows that the mouth is mostly affected. For Lehmann has found that the secretion is in the beginning thicker and less transparent, and contains more young and old epithelial cells than normal saliva; it contains much fat, little ptyaline, very rarely rhodan-potassium; and its reaction is alkaline. At a later period there are less solid elements, like the saliva secreted on artificial irritation of the nerve; it is still alkaline, contains much fat and mucous corpuscles, but no rhodan-potassium, and sometimes albumen.

"Thus it is evident that the indirect causes of increased secretion of the salivary glands may be very numerous; so numerous, indeed, that sometimes the etiology is very obscure. Thus Moore, in *Dublin Hosp. Gaz.*, August 15, 1858, reports the case of spontaneous salivation in a boy of four years and a half, in whom he was unable to discover any particular cause, although the anomaly lasted for a whole month. There was no tumefaction of glands, no affection of the tongue, no medicines had been taken. The administration of chlorate of potassa and tincture of catechu proved successful.

"Whenever, therefore, salivation is produced in a young child, you have to bear in mind all the possible causes of catarrh of the mouth and salivary glands, or of nervous, either peripheric or central, irritation. If you do, you will have less to say on teething and teeth, but will be more of a thinking, physiological physician.

"I have noticed already that affections of the mucous membranes in general are very common in early age. One of the most easily affected is that of the pharynx. Catarrh and inflammation of the pharynx, pharyngitis, are said to occur more frequently in adults than in children; and if such was the case, this would be a fact directly in contradiction to any assumption of the prominent influence of teething in this affection. But in late years we have had more opportunity to observe pharyngitis in children than adults, this result being brought about by a number of epidemic diseases principally affecting children, and by the frequent occurrence of stomatitis. The inflammation of the mouth is undoubtedly one of the principal causes of pharyngitis, so much so that a large percentage shows both stomatitis and pharyngitis in the very same individual. Stomato-pharyngitis, therefore, is a term not unfrequently met with in literature.

"I do not speak here of the chronic intumescence of the pharynx and particularly the tonsils, which is either the result of repeated acute inflammations, or is congenital. It is usually found in fair, pale, 'scrofulous,' and weakly children, but sometimes in robust ones also, in whom the lymphatic glands generally have a tendency to become enlarged. Their deglutition is but little interfered with, but the respiratory function, formation of voice, and development of thorax suffer much. Such children will snore in their sleep, breathe heavily, lose their breath with every effort, show a bloated and puffed appearance of the face, slightly moving nares, a pale or sometimes bluish complexion, and, on inspection, the mucous membrane of their throat appears thickened, and the tonsils greatly enlarged. The use of styptic gargles and the application of local cauteries is here of little or no use. In a number of cases absorbents will do better, and especially mineral waters containing iodine; but more is effected than by anything else—and surely in a large number of cases it is the only reliable remedy—by the removal of part or the whole of the tonsils, by means of a simple bougie and Museaux's hook forceps, or by Fahnestock's pharyngotome, or, as it has been called by a barbarous mixture of Latin and Greek, tonsillotome.

"Acute pharyngitis has, among its prominent symptoms, redness and swelling of the mucous membrane, enlargement of the tonsils, and generally, also, the uvula, which, by being elongated, and playing about the mucous membrane of the posterior and lateral walls of the pharynx, will keep up a constant irritation and give rise to a constant, obstinate, short cough, especially immediately after the child retires. Respiration is always, even in moderate cases, interfered with, and is sometimes very troublesome indeed; deglutition is very painful, and more so with liquid than solid food; hearing is sometimes injured by the consecutive affection of the mucous membrane of the Eustachian tube. Fever is more or less severe according to the severity of the cases; sometimes the circulatory and nervous system are so much affected that severe convulsions will set in. Dyspnœa will be visible on the child's face; the cheeks will be bloated, either livid or pale, eyes injected, tonsils, and sometimes other glands, enlarged, and the mucous membrane of the pharynx and 'tonsils highly injected, of livid, velvet-like appearance, and considerably swelled. Sometimes the injection is not at all general, but will appear in spots, exhibiting, as it were, a merely local, or a number of local inflammations. The inflammatory spots will particularly appear around the mucous follicles, which then show themselves as hard, prominent, whitish accumulations. Thus, there is a great variety of cases, while those who have a hereditary predisposition are most affected, and most exposed to relapses; and such cases as are of a phlegmonous character, being more severe, and less liable to suppuration, than those being merely superficial and erythematous. As a general rule, the prognosis is a very good one, absorption of the inflammatory swelling taking place after a number of days or weeks. Suppuration will sometimes occur, and the tonsillar abscess break after a number of serious symptoms, depending on aggravated deglutition and respiration, or chronic induration will take place, such as I have alluded to before; or the swelling of the mucous membrane, and effusion into the submucous tissue taking place to a considerable extent, œdema of the adjoining parts, thus, for instance, of the glottis, may ensue, and give rise to highly dangerous symptoms. This, however, is a very rare result of pharyngitis, scarcely any more frequent than gangrene or any of those frightful accidents, so much dreaded.

"I have stated that pharyngitis is frequently complicated with, and in fact is even dependent on, the existence of stomatitis. I do not believe that after the preceding remarks you will be impressed with the influence of dentition, in producing severe affections of the mucous membrane of the mouth. Still less have we reason to attribute pharyngeal symptoms to any great extent to the protrusion of teeth. Nor is there any necessity of falling back on unknown, or hypothetical, or improbable causes, where there are many manifest ones. Acute pharyngitis is frequently noticed in the heat of the summer, complicated with troubles of the digestive organs, loss of appetite, furred tongue, headache; it is easily brought on by a sudden change of temperature, general or local, and individual, or by the direct influence of cold temperature on the mucous membrane of the pharyx. This occurs particularly in such children as are used to breathe with their mouths open; here you have one of the reasons why it is so necessary to accustom children to have their mouth shut, and breathe through the normal passages. Other cases of pharyngitis are brought about by direct lesions, by means of hot food and beverages, stimulants, and sharp-pointed bodies being brought in contact with the mucous membranes. Others are observed during the course of diseases of the tongue, bronchia, and lungs, apparently from the mere contiguity of the mucous membrane. Another number, and not a small one, is produced by the influence of epidemic diseases. Particularly the eruptive fevers have a tendency to be localized on the mucous membrane of the pharynx, thus morbilli and variola, but more than any others, scarlatina and diphtheria. During the last few years, the influence of these two, especially of diphtheria, has been exceedingly great in this city, and a large part of the country, so much so that the greater percentage of diseases occurring in children were either directly seated in the pharynx, or complicated with a pharyngeal affection. I have been accustomed to inspect every child's pharynx when brought in for any sickness, not that every pharyngeal complication must necessarily be a very serious disturbance, but because I want to know the full range and extent of a disease, and, gentlemen, because a number of doubtful cases will be found to be nothing else but an inflammatory or exudative pharyngeal affection, in such times. The large number of pharyngeal affections occurring in this city for the last few years certainly depended on the prevalence of scarlatina and diphtheria, especially the latter; the pharyngitis either following for a long time, or followed by, diphtheritic exudation. So frequent have these cases been that it has been possible to form whole classes of cases under the heads of diphtheritic pharyngitis (without any exudation being present) and diphtheritic fever.

"What I, therefore, lay particular stress on is this—that a large number of cases of pharyngitis occur in early age, that their causes are both various and frequent, that the pharynx is particularly exposed to injuries, and that a large number are brought on by the direct influences of epidemic diseases. I may add that the protrusion of the teeth ought not to be referred to as a cause of pharyngitis, as epidemic diseases are more found after the first and second year than before. And I finally desire you to remember this caution, viz., to examine the pharynx of a child at least in every case in which the diagnosis is doubtful. By doing so you will not only reduce the number of uncertain diagnoses, but you will reduce the number of cases of 'difficult dentition' considerably. You will often find pharyngitis, with or without stomatitis, to be the simple and easily removed cause of many serious troubles attributed to dentition.

"There is no more connection between the mode of treatment of pharyngitis and dentition than there is between the nature and etiology of both; local and intestinal derivants, diaphoretics, purgatives, and emetics have been recommended. Gargles have been resorted to in advanced children; mustard-plasters and cold water, according to hydropathic principles, have been applied. Have they anything to do with dentition, or is the protrusion of a tooth rendered easier by these, any more so than by the incision of a tonsillar abscess? I think not, nor do you; what I think is, that dentition, as a means of producing pharyngitis, except in those few cases in which stomatitis and consecutive pharyngitis may be the result of an abnormal protrusion of an abnormal tooth, through an abnormal gum, in abnormally irritable children, is a very unimportant and uncommon factor. As to treatment, I should again urge the administration of chlorate of potassa, or soda, both internally and locally. I have not seen better results from any other medicine in any case which was not past the possibility of absorption."—(*Amer. Med. Times.*)

"*The Antrum of Highmore and its Diseases.* By JAS. E. GARRETSON, M.D, of Philadelphia. 'While,' says Dr. Richardson, 'we cannot trace out the nature of that condition of the blood which gives rise to purulent formations, we are informed by observation of the external conditions which foster it. We learn that the pus-producing disposition is an indication of deterioration of blood. We see that when the system is enfeebled, whether by diathesis hereditarily supplied, as by the strumous diathesis—whether by epidemic influences, or whether by deprivation of nitrogenous food, or the inhalation of bad air—that under these circumstances the tendency to purulent formations in local structures is marked, and that, in extreme instances of the kind named, the act of suppuration may take its absolute origin from blood thus depressed.'

"'Hence, we have reduced almost to a principle in medicine, the saying, that suppurative tendency is a sign of an impaired or vitiated nutrition. Hence, also, we reason in speculative argument, that pus is blood transformed into a lower form of organization, and we adduce, in evidence of this view, that the purulent fluid is incapable of organic construction, and that animals in which the respiration, the circulation, and the animal temperature are more than ordinarily active, the formation of pus, even in an open wound, is an occurrence almost unknown.'

"These remarks, from the lectures of Dr. Richardson, cannot fail in being suggestive; they have, indeed, much meaning, but I must be permitted to suggest, to the student reader at least, that their signification is limited, puruloid conditions are, without doubt, and as the rule perhaps, indications of asthenia; but it would be very wrong indeed to jump from such data to the conclusion that every puruloid disease requires treatment from the constitutional stand-point, and particularly will this hold good as the diseases of the antrum are concerned.

"All diseases should be treated on principle. * * *

"Ozœna depends, as the rule, upon some constitutional taint; the treatment, as the rule, is therefore to be systemic. Yet, not very long since I treated a lad for a fetid discharge from the nostril where the fetor depended on a diseased turbinated bone, the result, as I discovered, of a direct local injury. Here was ozœna without constitutional association. A complete and radical cure was effected after two weeks, simply by the injection of chloride of zinc in solution.

"In a previous article I suggested that puruloid conditions of the antrum had origin chiefly from two directions :—

"Firstly, from diseased teeth. Secondly, from constitutional disturbance, manifesting itself in the mucous tissue. I also desired to convey the inference that where the fault was markedly in the first of these directions, the practitioner would err on the right side, if in his first consideration of the case he should incline to look upon the tooth only in the light of an exciting cause, searching farther for what might be the predisposing conditions. Here, however, as may be inferred, I desire to imply, that most vicious lesions of the cavity may exist, and yet constitutional conditions have really nothing to do with them, and in the treatment needs not at all to be taken into the account.

"As a line in practice, however, running between these two conditions, I may allude to the fact of having met cases where inference of constitutional association seemed most marked, yet, without a resort to other than local treatment, I have soon cured my patient. These are the kind of cases in which the medical man must feel his way; if the practitioner is an observer, it is not likely that more than a week will pass without yielding him just conclusions.

"Coming now to the investigation of cases where the cause is to be found alone in some cachexia, we have only to refer back to the general features of disease as manifested on mucous membranes.

"The most common, and indeed not very unfrequent cause of engorgement of the antrum—particularly mucous engorgement—is simple catarrh of the Schneiderian membranes. The patient takes a cold, the excitement expends itself about the nares; by simple continuity of structure, the lining membrane of the sinus becomes vascularly excited; perhaps the duplication at the orifice, because of greater nearness to the central ring of inflammation, becomes congested to such extent as to close the opening; thus we have the elements for engorgement and the mucus thus confined will, if not vented, sooner or later act as such a source of irritation that it will become to the membrane of the cavity almost precisely what the virus of gonorrhœa becomes to the continuation of the same membrane lining the urethra. Trouble from this cause is, however, generally so slight and so quickly over that it is seldom promimently marked, either to patient or practitioner.

"The symptoms designating this condition are, first, simple vascùlar excitement of the membrane lining the nares, accompanied with increase of mucus.

"As the grade of inflammatory action advances to complete congestion, the excess of mucus associated with the immediately preceding stage is succeeded by a most uncomfortable deficiency in the secretion.

"This dryness is associated with all nasal inflammations of advanced grade, but when the trouble is to implicate the antrum, it is even specially marked. A single moment's consideration of the parts makes this very plain; the nares are the natural outlets for the antral secretions; in ordinary Schneiderian catarrh, the extensive secretory surfaces of the antra are comparatively unaffected; of course they serve to lubricate to a greater or less extent the passages. When, however, the grade of inflammation is of sufficient extent to congest the duplicatures of membrane which form the nasal outlets, then because of the retention of the mucus the extreme dryness is induced. This excessive dryness may be said therefore to offer the first diagnostic sign of antral engorgement from simple catarrh. From this point, the disease advances or declines. If it declines, the trouble may have been of such trifling inconvenience as scarcely to have attracted the attention of practitioner or patient. If, on the contrary, it advances, the patient will soon be made conscious of the advancing engorgement by a sense of growing heaviness in the cheek, attended by pain of a dull, sluggish character. The progress of the disease from this condition is precisely the same as that described as accruing from dental troubles.

"*Treatment.*—This is to be conducted on general principles. Where the disease is seen in its incipient stage, it will, perhaps, be found unnecessary to do more than administer a saline cathartic; or, what I have found a most satisfactory treatment, is, to administer to the patient at bedtime the sixth or quarter of a grain of sulphate of morphia dissolved in an ounce of the liq. ammoniæ acetatis. This latter treatment I have seldom found fail in breaking up these limited congestions.

"Where, however, the disease has advanced to engorgement, and the antrum is found to be enlarging, it may be necessary, in order to insure against even more serious lesions, that treatment shall be directed immediately to the cavity. To accomplish this, extract the second molar tooth, and penetrate the cavity through the alveolus of the palatine fang. In this way such medication as may seem indicated may be readily employed; indeed, for a cure it may be only necessary to keep patulous the wound, leaving the rest to nature, or, if there should seem a lack of vital force, I do not think a much happier stimulant can be employed than the tinct. of iodine.

"*Furuncular Epidemics.*—It will be found, I think, the conclusion of every one who has observed in the direction, that during the existence of furuncular epidemics, mucous and purulent engorgements of the antrum are most common. This is not strange if we consider the epidemic condition in the light of an exciting cause alone, for in no single instance, where my attention has been called in such direction, have I been unable to discover a predisposing cause in a dead or diseased tooth. The same condition of things exist in regions where the intermittents are endemic. All the odontalgias and cephalalgias of such a county are apt to be quotidian, tertian, and quartan. Furuncle is a condition associated, it would seem, with some derangement of the digestive or cutaneous functions. When epidemic, it would be in proof that a condition existed adverse to the performance of certain physiological functions. When the existence of a predisposing cause of disease about the antrum, it is not at all strange that the addition thereto of an exciting cause should at once increase the effect of the irritant even to the production of active disease—and such, in truth, is the case, the patient escapes the purulency of boils, but he has purulency of the antrum.

"*Treatment.*—This I need scarcely refer to—it consists, imprimis, in removing the source of local irritations; secondly, in correcting the constitutional disturbances.

"*Scorbutis.*—This diathesis, as may be inferred, predisposes to antral purulency and ulceration. To understand the local condition thus induced, it would be only necessary to examine the gums in an individual so afflicted; the condition of the antrum is akin with the condition of the mouth. The treatment, to be successful, must be from the constitutional stand-point. If injection of the cavity seems indicated, it must be gotton at as before directed, or a canula can be passed into it through the natural opening in the middle meatus; the latter is however difficult, and therefore liable to objection.

"*The Exanthemata* are said to associate, not unfrequently, their sequelæ with this cavity. Treatment thus demanded could need no special consideration; it would be a treatment founded on general principles.

"*The Mercurial Diathesis.*—I have before referred to the troubles of the cavity thus provoked. Mercury holds a double pathological relation to the antrum; it predisposes from its constitutional relations, and actively and locally excites, through the periosteal inflammation it excites in the alveoli of the teeth. (The same I should also have remarked of scurvy.)

"*Treatment.*—The indications here are twofold. Resolve, if possible, the inflammation about the teeth, (see paper on alveolar abscess,) and eliminate the mercury from the system. The chlorate of potash and the common muriate of soda are valuable medicines in this direction; the latter I frequently employ, and with marked success.

"*Syphilis.*—This is a disease which it might be inferred would, of course, have an affinity for such mucous lined surfaces as the antrum. Now mine may be a singular experience, but in contradiction of many authors who have written on the subject, I must say that, with the wide scope afforded by such a hospital as the Blockley, (where for over a year I gave the study of the venereal disease the closest attention,) I was unable to find a single case of diseased antra which could with justice be attributed to the cachexia. As I remarked in a previous paper, I have met cases where the origin has been traced for me in such a direction. And I will not deny that in some cases this origin may be justly so traced; but in every case that I have seen, the mercury administered for the cure of the syphilis has seemed to me as having much more to do with the condition than any dyscrasis enduced by the virus."—(*Med. and Surg. Reporter.*)

Influence of Occupation upon Health.—"Few, possibly none, of the more arduous callings in life can be exercised without a measure of wear and tear in the human machine. Civilization, by coercing into her service the less destructible elements of creation, stone, iron, and the like, has directly testified her knowledge of how limited are the capacities of the human organism, and her distrust of its unaided powers for the satisfaction of her requirements. In no way can the destructibility of the working material with which we men are provided be better seen than by a consideration of the special diseases or casualties which the exercise of particular professions entails upon their adepts. The statesman, clergyman, and lawyer have their especial sore throat, the doctor his dissecting wound, the knife-grinder his phthisis, the painter his colic, the lucifer-match maker his necrosis, the chimney-sweeper his cancer; and so on through a long chapter of accidents, ending only, it would appear, with the last item on the catalogue of professions. In presence of this almost daily increase of morbific causes, it behooves medical science, as the sentinel of civilization, to be more than ever on the alert, and, crying 'Qui vive!' to check the hurtful progress of such new-comers. Such is the object of a paper read at the Academy of Medicine last Tuesday, by M. Delpech, one of the candidates for the vacant chair in the section of Medical Jurisprudence and Public Hygiene. Some few years back, this writer, in a communication to the Academy, first drew notice to the baneful effects produced by the sulphuret of carbon upon the workmen employed in the preparation of vulcanized India-rubber. The process termed 'vulcanizing' is effected by the exposure of caoutchouc to the action of a mixture of sulphuret of carbon with chloride or bromide of sulphur; and, according to M. Delpech, the respiration of air charged with the vapor given off during the operation produces, in a large proportion of the workmen so engaged, symptoms not unlike those resulting from the inhalation of ether, chloroform, or other anæsthetic agent, with the difference that in the former case the effects are more gradually developed. The particular branch of the India-rubber manufacture whence the author has gleaned his most prominent facts is that in which the caoutchouc is blown into bags or bladders for medical and other purposes; and here he has divided the symptoms of intoxication (to use the word in its classical sense) into two stages. In the first are ranged headache, giddiness, cutaneous hyperæsthesis, with feelings of creeping or pricking, and muscular pains. A certain degree of excitement and agitation also is not uncommon, together with a tendency to laugh or cry without reason; and with these half-hysterical symptoms may coexist sleeplessness, night-mare, and great irritability of temper, sometimes ending in confirmed mental alienation as a climax. In other cases the stimulus has affected the generative functions, as evinced by an increase of the venereal appetite; or the muscular system, in the way of spasm or stiffness; or, again, the digestive or respiratory organs, by the production of bulimy, nausea, cough, and oppression; and, lastly, the heart and circulation, in the way of fever and palpitation. In the second stage, the poison would seem almost exclusively to have impaired the functions of the nervous system, as exhibited by decline of the intellectual powers, melancholy, indifference, loss of memory, defective vision, deafness, and insensibility of the skin, together with loss of sexual power, atrophy of the seminal glands, general muscular debility, going on to paraplegia, wasting, and cachexia. By means of experiments on animals, M. Delpech has ascertained that rabbits, for example, although easily affected by the vapors of the vulcanizing mixture, or by those of the sulphuret of carbon alone, passed several days with impunity in an atmosphere charged with chloride of sulphur, and he therefore argues, with much apparent fairness, that the former ingredient alone is responsible for the baneful effects resulting from the process. By way of practical deduction, he infers that if the work-people could be so placed, when manipulating these poisonous materials, that a glass screen should intervene between them and the caoutchouc under preparation, their arms being passed through apertures properly stuffed in order to prevent the entry of vapor, much benefit would accrue, in a hygienic point of view, to the *employés* in this branch of trade."—(*Paris Correspondent of Lancet.*)

"*The Allotropic State.*—Of all the wonderful facts embraced in the science of chemistry, there is none more wonderful than that curious property which certain substances have of passing into an allotropic condition. Professor Youmans compares it to the state of a man when he is asleep. The substance, by being subjected to certain manipulations, has its properties so completely changed that it seems to be no longer the same substance. This property has lured some of our most eminent modern chemists into the old dream of the alchemists, of changing iron and other cheap metals into gold.

"Perhaps the most valuable use that is made of the power of putting substances into an allotropic state, is in the manufacture of friction matches. Phosphorus takes several allotropic conditions, in one of which it is known as red phosphorus. In this state it does not take fire from friction, nor does it emit the deleterious vapors which have produced such frightful effects upon persons employed in match manufactories. The phosphorus is, accordingly, by exposure to light under certain conditions, and other manipulations, passed into the allotropic condition of red phosphorus, when it can be transported or handled with impunity. In this state it is used for making matches, and it then slowly returns to its normal condition.

"By several processes iron can be thrown into an allotropic condition, which has been called the passive state. In this state it is not acted upon by nitric acid, and its properties vary in several particulars from those which it ordinarily exhibits. If a piece of iron is put into nitric acid of specific gravity of 1·3, it dissolves freely with effervescence, but if a piece of platinum wire to be placed in the acid, and then the iron be introduced in contact with the platinum, the acid will now act upon the iron, even if the platinum is withdrawn. Another piece of iron put into the acid in contact with the previous piece, will become affected in the same way, and so on with the third or more pieces. Another mode of making iron passive is to oxidize one end of the piece in the flame of a lamp. It may also be effected by making it the positive pole of a battery, by a blow, and in other ways. A piece of passive iron can be restored to its normal condition by rubbing it, or by bringing it in contact with active iron.

"The allotropic state of substances is a comparatively new and very inviting field for chemical research. It is supposed by some chemists that all of the elements may be subject to this mysterious change, and the investigation of the subject will probably yield some very curious results." (*Scientific American.*)

"*On Passive Steel.* By M. SAINT-EDME.—Continuing my researches on the passivity of iron, I found that there exists a difference between the affinity of steel and that of iron for the passive state. I have the honor to present to the Academy the results which led me to this conclusion:—

"1. If a steel rod is plunged into ordinary nitric acid, (36° Baumé, density 1·34,) a rapid and tumultuous boiling takes place round the metal, showing, in the first instance, a very marked action of the acid, but in a very short time—generally less than twenty seconds—the disengagement of gas suddenly ceases and the steel becomes passive. If a rod of iron is placed under the same conditions the action is continuous. This phenomenon takes place with all steels, whether English, German, cast, forged, etc., and the reaction is so decided that it may be considered as a distinctive and unequivocal characteristic of steel.

"2. It is a well-known fact that iron wire rendered passive resumes its active condition if made to communicate with a piece of active wire, if both are plunged into the same nitric acid. Several years ago M. Schöenbein noticed that iron wire, made passive by immersion in fuming nitric acid, had the property of rendering an active piece passive by contact. He could not then account for this variation in the stability of the chemical indifference of iron. The following experiment clears up that which then seemed so puzzling: Place a rod of steel in ordinary nitric acid, leaving a part above the liquid; the metal becomes passive, as before described; place beside it a rod of iron, which undergoes a continuous action; then, as soon as the two rods are put in communication, by joining the portions above the liquid, or by uniting them in the acid itself, the iron instantaneously becomes passive. Passive steel, then, like platinum, renders iron instantaneously passive.

"3. Steel preserves its passiveness under conditions which would entirely destroy that of iron. Iron loses its passiveness when the temperature of the acid reaches 40° C., while a rod of passive steel may remain any length of time in boiling nitric acid without losing its passivity. This experiment has been several times repeated, and is found to be necessary to make the steel passive by contact with cold nitric acid, and then to plunge it in the boiling acid.

"4. Iron cannot remain passive in nitric acid containing a certain proportion of hypo-nitric acid. If a galvanic couple is prepared, of which the positive electrode is a rod of passive iron plunged in nitric acid, (density 1·34,) in about half an hour after the circuit is completed the attack on the iron is determined. Under the same circumstances, steel remains passive a longer time, but once a certain point is rapidly reached, it again becomes active.

"The passive state is usually explained by the formation of a layer of non-salifiable oxide, which forms electro-chemically on the surface of the metal. It must, then, be admitted that iron, in the state of steel, acquires a greater affinity for nascent oxygen, and that the stratum of non-salifiable oxide, which is instantaneously produced on the surface, is more adherent, more impermeable to acids, than simple iron. It appears, then, necessary to make a distinction between passive steel and passive iron."—(*Comptes Rendus* and *Chemical News.*)

"*On the Structure and Growth of the Tooth of Echinus.* By S. JAMES A. SALTER, M.B. Lond., F.L.S., F.G.S. Communicated to the Royal Society by THOMAS BELL, Esq. Received March 5, 1861.—

The author commences his paper by stating that the researches upon which it is based were made more than four years since, and then without the knowledge that the structure had been previously investigated by others.

"An abstract of the *literature* of the subject (contained in very narrow limits) is then given.

"In 1841, Valentin, in Agassiz's 'Monograph on the Echinodermes,' (*Anatomie des Echinodermes*,) published a description and many good figures of the minute anatomy and growth of the Echinus-tooth.

"Professor Quekett, in his 'Lectures on Histology,' (1854,) referring to the minute *mature* anatomy of the organ, states its ultimate structure to resemble bone and dentine of vertebrata.

"Dr. Carpenter, in his work 'On the Microscope,' speaks of the tissue of the tooth as essentially of the same nature as the shell of the Echinidæ generally (1856.)

"Lastly, Professor W. C. Williamson describes the subject more fully than his predecessors, entering into the question of the development of the tooth both generally and histologically, (though apparently in ignorance of Valentin's Essay,) in a paper on the 'Histology of the Dermal Tissues,' etc., in the 'British Journal of Dental Science,' 1857.

"The coarse anatomy and relations of the Echinus-tooth are then described, and the question is discussed as to how far the organ resembles and how far it does not resemble the incisor tooth of a rodent mammal, to which it has constantly been likened.

"Some remarks then follow on the method of investigation, which the peculiar physical characters of the structure render very difficult.

"Before describing the histology of the mature tooth, the author premises some succinct remarks upon the several elementary parts that are formed at its growing extremity, and by which its complex structure is built up—showing how the shape and plan of these elements determine the microscopical appearances of the several regions of the tooth as seen in different sections.

"These elementary parts are—(1st) the *Primary plates*, which consist of a double series of triangular sheets of calcareous matter, and which constitute the physiological axis of the tooth, about which and connected with which the four secondary elements are developed. These latter are (2d) the *Secondary plates*, lappets of similar calcareous sheets attached to the outer edge of the primary plates; (3d) the *Flabelliform processes*, elaborate reticulations of calcareous fibres ending in fan-shaped extremities; (4th) the *Keel fibres*, certain long cylindrical rods with club-shaped ends of the same chemical nature, which pass toward the enteric region of the tooth in their growth; and (5th) the *Enamel rods*, which are minute very short developments of the same character, and which are formed in the opposite direction. Thus far a primary and secondary stage of formation are represented: a third stage, that of consolidation, now occurs in the development of (6th) the *Soldering particles*, multitudes of minute discs of carbonate of lime which appear over the whole surface of the previously formed elementary parts, and by which they are soldered together, the intervals between these (in a certain sense) constituting the tubular character of the mature tissue.

"The primary plates, secondary plates, and the proximal portion of the flabelliform processes are stated to constitute the body of the tooth—the distal extremities of the flabelliform processes the *skirtings* of the enteric region of the body of the tooth; the keel fibres wholly form the keel; while the short enamel rods compose the thin white layer on the dorsal surface of the tooth—the enamel.

"The histology of the tooth is remarkable as exhibiting apparent inconsistencies in different lines of section. A vertical section of the tooth presents the appearance of vertebrate bone, lacunæ, canaliculi, and lamellæ; while a transverse section displays some regions resembling dentine, (the body of the tooth,) and others having the closest similitude to an oblique section of the shell of some Mollusca, such as *Pinna.*

"The author then proceeds to describe in detail and with particularity the form and progressive growth of the several elements of the tooth, as they are met with in examining the growing extremity, and proceeding from it toward the mature structure, as long as the elements are susceptible of isolation and individual examination. The anatomy of the soldering particles, and their relation to the production of the cavitary structure of the tooth, is specially dwelt upon. The soldering particles are supposed to be isolated at first, but as they enlarge they become connected by a thin film from their upper and under faces. This occurs before the final consolidation of the tissue, and before the soldering particles are indissolubly connected with, and themselves indissolubly connect, the contiguous elements of the tooth. At this stage these particles are still susceptible of isolation, and they may be separated *en masse,* being held in relative position by the films that connect them. The soldering particles and the connecting films thus constitute a tubular system, which has an independent existence before the final consolidation of the tissue, and this tubular system is introduced between, and interpolated among, the previously existing elementary parts of the tooth.

"The author concludes by expressing a coincidence of opinion with Dr. Carpenter, that the minute structure of the tooth is essentially of the same nature as that of the shell of the Echinidæ generally."—(*Quarterly Journal of Microscopical Science.*)

Conservative Surgery.—The following remarks upon this highly important subject, by the editor of the *American Medical Times,* are quite *apropos,* and will meet with a hearty response from all true friends of progress and humanity. They are as applicable to the specialty of dentistry as to general surgery; for it is as much the duty of the dentist to endeavor to preserve the perfect integrity of the body as it is that of the practitioner of any other branch of medicine.

"Scientific surgery proposes, as the problem of our time: How may diseased or injured limbs or parts best be preserved? The true reputation of a surgeon is now based, not on the number of limbs amputated, but on the number saved from amputation—not on the amount of the deformity created, but on that relieved; and it is interesting to note the multifarious ways in which this problem is being solved by earnest and practical students. Shrewd observers of nature's resources are devising, and cunning hands are executing, in every department of practical surgery, new methods of removing diseased parts and structures, or preserving the healthy, in however close proximity. So well established and well defined are many of the more recent rules in operative surgery, that operations which were legitimate a score of years ago, would to-day be justly accounted malpractice. Let us notice some of the more important advances of conservative surgery.

"The regeneration of bone from the preserved periosteum enables us to save the limb in necrosis. The number of amputations in hospital practice was formerly largely increased by those cases of necrosis which involved a considerable portion of the bone of any extremity. If the dead bone was removed by an operation, the periosteum was removed also, and the result was a useless limb. Surgeons preferred, therefore, amputation, in many cases, to the removal of the dead bone, so much would the limb be crippled by the latter operation. It now appears, however, that the periosteum has the power of reproducing the removed bone entire, and in a condition capable of supplying its function. And very marvelous are many of the instances of the reproduction of bone. We may have the entire shaft of the tibia renewed and the leg restored to its former serviceableness. The radius, with its complicated office of rotation, is equally capable of regeneration, both in tissue and function. The clavicle has thus been reproduced, and has proved quite as useful as in a healthy state. The most remarkable instance of regeneration is seen in the inferior maxilla, which has now been so frequently produced entire, with the exception of the teeth, that its renewal, when the periosteum is preserved, may always be prognosticated. The rule may be considered established on immutable principles, that in the removal of bone, we may have the vacancy supplied with the same tissue, if the periosteum is preserved. Amputation in such cases, though formerly sanctioned, would, in our day, be an unjustifiable procedure, if performed simply because of extensive necrosis."

Illusions of Sensibility.—The anomalies of sensation are both numerous and wonderful, and yet are probably, in all cases, but aberrant expressions of the special functions of the nervous system. Even in those cases in which either pleasurable or painful sensations are experienced in parts entirely distinct from those in which they originate, they are, doubtless, always in due harmony with the general laws of innervation. Indeed if sensation be regarded as the consciousness of an impression, it must be admitted to be in all cases and in every degree or variety of expression as but a mental phenomenon, and hence as purely psychical in its character. In favor of this view, witness for instance, the many and striking illusions of both general and special sensibility in dreaming, insanity, delirium tremens, neuralgia, etc., as well as in those remarkable cases, in which sensation is referred to parts which have been completely separated from the body, as after amputations, extraction of teeth, etc., in which sensitive impressions are apparently felt in the original organs or their artificial substitutes. The following observations from the *Lancet*, are not only of interest within themselves, but have a practical bearing upon the subject in its various relations: "M. Rizet, surgeon-major to the 32d Regiment of the Line, in France, mentions, in the *Gazette Médicale de Paris* of the 2d instant, several cases illustrating certain sensations experienced in stumps, in confirmation of similar cases published in the same journal on the 5th ult., by M. Gueniot. M. Rizet's four cases refer to amputations at the shoulder-joint, of the arm, of a portion of the foot, and of the leg. In all these cases the patients mentioned sensations as if the fingers or toes, as the case might be, were retracted in the wound or stump, so much so that one of the patients insisted on the dressings being taken off, complaining that some foreign body had been left in the soft parts. Another peculiarity experienced by some persons who have lost a limb, is the fear of knocking the absent limb against door-posts or pieces of furniture, when going by. M. Rizet asks the question whether these illusions, which were common enough before chloroform was used, are now as frequently met with. A point of practice worth notice is the fact that sensations of the kind described were always experienced in the cases which made a good recovery."

"*Theory of the Vertebrate Skull.*—The theory that the skull is composed of vertebræ, analogous to those of the spine, is not yet quite firmly established in science. Thus, Professor Owen has recently affirmed it for all classes of vertebrate animals, while Professor Huxley is averse to it. It is not generally known that the great German poet Goethe is the originator of this theory, to which he was, after long preparatory studies, led during his journey through Italy in 1790, on examining a sheep's skull, which he found in the Jewish cemetery in Venice. After him it was especially Oken, in Germany, and Dumeril, of France, who worked the subject; and lately Professor Virchow has taken it up and published a work on it."—(*Med. Times and Gaz.* and *Amer. Med. Times.*)

MISCELLANY.

In a recent number of *Championnière's Jour. of Pract. Med. and Surg.*, Dr. De Chilly claims that Boyer anticipated Flourens, Ollier, and others in the discovery of the reproduction of bone by the periosteum. He says that in Boyer's work on practical surgery, "all the circumstances of the reproduction of bone by the periosteum are carefully enumerated, according to the origin, extent, or depth of the mischief," and presents the following among other quotations therefrom in proof of his statements: "When the periosteum of both surfaces of a bone has been spared, it inflames, the vascular net-work becomes more apparent, the thickness of the membrane increases, it parts from the modified structures, and the interval is immediately filled up by a gelatinous, or more properly an albuminous substance, at first semi-fluid and jelly-like, but subsequently more consistent and adhesive to the periosteum only. This albuminous layer becomes more compact and opaque; red patches are soon discernible, and it blends with the enveloping membrane from which it can no longer be distinguished. In this mass, streaks and layers of bony deposit, at first sparse and disseminated, are, after a time, visible; they increase in number and close with each other; the thickness and density of the mass daily become greater, and at the same time it is deflected and swerves from the mortified bone; for a long time it can be readily cut through, and the surface of the incision presents a cellular mixture of solid and apparently fleshy aspect; the osseous structure at last shows itself unmistakably; *a new bone has been formed*, and the surface corresponding to the mortified fragment remains covered with a thin layer of soft texture, which replaces the internal periosteum."

In one of his admirable lectures on the nervous system, in the *Med. Times and Gaz.*, M. C. Bernard makes the following declaration respecting the independent action of the spinal centres: "It is an indisputable truth, that the spinal cord enjoys the property of generating nervous force; and that when its communication with the brain is intercepted, this force accumulates below the point where its columns have been divided; we here discover another proof of the total independence of this central axis, with reference to the brain; in other words, the spinal cord is not a mere prolongation of the encephalic mass, as has been often stated, but a distinct and independent nervous centre, possessing its own special properties, and exerting a direct influence over the nervous system."

The Paris correspondent of the *Lancet* states that in a memoir read before the Acad. of Sciences, upon the structure and physiological properties of tendons, M. JOBERT DE LAMBALLE related some experiments which are rather confirmatory of facts already tolerably well known than the details of fresh discovery. He says "that although the tendinous tissues in the normal state are perfectly inextensible, and snap asunder on the application of a force which would test their powers of elasticity, yet, under the influence of disease, both the conditions of elongation and contraction are met with. He observes that the comparison made by the older observers between the tendinous tissues and cartilage, enamel, or the various inorganic products in the body, is incorrect, as the former are in reality organs, and contain within themselves all the indispensable elements of nutrition. Haller, the first to investigate the subject of the insensibility of tendon, failed to trace the extension of nervous filaments into these structures, and M. Jobert is led to side with him, observing, however, that minute nerves may be found to ramify on their surfaces, even though they do not actually penetrate into their substance; and to the irritation of these filaments he attributes the sensibility produced by inflammatory action which may have been set up in the tendinous sheaths."

The same writer refers to "a case which was submitted to the Academy of Sciences by M. Ollier, of Lyons, in which the osteoplastic function of the periosteum had been turned to account for the repair of a dilapidated nasal bridge," and adds: "M. Langenbeck, Professor of Clinical Surgery at Berlin, now brings forward a plan for the Academy's approval, in connection with the restoration of the bony substance in cleft palate. This operation, which has been successful in two cases where the fissure extended from the incisor teeth in front to the extreme limit of the palate behind, consists in the detachment of two flaps of mucous membrane and subjacent periosteum on each side of the gap, and in their union by sutures. In both the instances referred to by M. Langenbeck, the vacant space was presently filled by a solid layer of bone."

In reference to some observations on "the therapeutic action of the alkaline salts, obtained by the combination of phenic acid with bases of potash and soda," it is stated (*Ibid.*) that M. BOBŒUF says "the soluble alkaline phenates applied in solutions of a fifth or tenth degree by means of compresses on freshly inflicted incised wounds, act with the greatest effect as styptics, and immediately arrest hæmorrhage."

In his summary of papers contained in the Transactions of the American Medical Association for 1860, in the *Medical and Surgical Reporter*, DR. O. C. GIBBS states that in his report on surgery, DR. MCDOWELL observes: "In diseases of the lower jaw, the upper or alveolar portion is in nearly all cases first affected, and can often be removed, retaining the base of the bone. To this portion the muscles and the tongue are attached, and it is of the first importance that it be saved when it can be."

In relation to the removal of the parotid gland, the same writer says DR. MCDOWELL makes extended remarks, and argues this question in the affirmative. He "proves that it can and has been repeatedly removed entire, and says he has operated *eleven* times with success."

The *Chemist and Druggist* has the following directions for preparing a solution of silver for electro-plating: "To a neutral solution of nitrate of silver add gradually a solution of cyanide of potassium, when a white precipitate of cyanide of silver will fall; continue adding until precipitation ceases. The liquid, which is solution of nitrate of potash, is to be poured off, and the precipitate well washed. This, which is pure cyanide of silver, is now fit to be added to the solvent liquid, which is prepared by dissolving two ounces of cyanide of potassium in a pint of rain or distilled water. By this process a plating solution, free from impurities, is produced."

The *Scientific American* notices a new alloy invented by MESSRS. BROWN and WHITE, of New York, the proportions of the ingredients of which it is not, it says, at liberty to state. This alloy is composed of steel, zinc, tin, and manganese. Its density "is greater than the mean density of its constituents; it presents a beautiful white and lustrous appearance, and is adapted, we are assured, to the manufacture of many articles in universal demand, such as axes, cutlery, etc."

The same paper contains the following patent claim for an improved mode of setting artificial teeth, by DAVID STEINBERG, of San Francisco, California. "I claim combining the teeth with the gold, platinum, or other metal plate, by means of India-rubber, or other gum capable of vulcanization, applied in the manner specified."

["This invention consists in the combination of hard, vulcanized India-rubber, with a gold platinum, or other metal plate, as a base for artificial teeth, in such manner that the India-rubber serves as a means of uniting the teeth with the plate, but is prevented from coming in contact with the palate and gums by the interposition of the plate, by which combination several important advantages are obtained."]

BIBLIOGRAPHICAL.

Introductory Address on the Life of Baron Larrey. By D. HAYES AGNEW, M.D. Published by the Class. Philadelphia, 1861.

This is a very interesting biographical sketch of the great French surgeon, of whom Napoleon the First said, he was the most virtuous man he had ever known. Although such memoirs are of more immediate interest to the medical and biographical student, they are of much value to all classes of society, for the lives they delineate serve as spiritual levers to elevate the thoughts above the grosser affairs of life, and intensify desire for a nobler sphere of action than that in which the mass of mankind are so deeply engaged.

The Physician's Pocket Memorandum for 1862. By C. H. CLEAVELAND, M.D. Cincinnati: BRADLEY & WEBB.

In addition to the usual arrangement for recording professional visits, etc., this publication contains a variety of matter upon medical topics, which will increase its usefulness to physicians.

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, FEBRUARY, 1862. No. 7.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Many years ago we commenced the use of *plugging forceps*—we also spoke of them in an article under the head of "Plugging Teeth," in the *Dental News Letter*. We cannot now tell where we got the first idea of using them for packing gold, but we made the first ones out of extracting forceps, and in that way matured patterns for the instrument-maker to work by, in constructing better ones for us; but it was always necessary to file up and fit the beaks for our own purpose and places where they were to be used, no matter how careful the manufacturer might have been in endeavoring to produce exactly what we desired. We have filed up a number of sets for friends. The first were made for us by Mr. Kern, of our city, but after they had been described in the *Dental News Letter* they were made generally by the instrument-makers of this city as well as elsewhere. It is impossible, we think, for an instrument-maker to so nicely construct a plugging forceps as to answer every purpose required, so it is necessary for the dentist first to know precisely where to use them, with regard to space in the mouth and the power he wishes to exert with them, and then make the final *fit* himself. We have looked over plugging forceps which were intended to be like our own, but have failed to see any which we could have used successfully without altering.

On visiting New York shortly after having published an account of our forceps, we stepped into an extensive establishment on Broadway to get some bur-head drills, for making which the proprietor was celebrated, and while conversing with him he called our attention to some new-styled forceps for plugging teeth, and desired us to become possessed of them as they were a decided improvement, and every dentist ought to have them. We found fault with them as useless, and pointed out the reasons, but which he was not quite willing to acknowledge, because, perhaps, it seemed as if we did not consider he was qualified to construct a forceps. He at last inquired where we hailed from. We answered, Philadelphia. Perhaps, then, you know Dr. White? We answered, yes, and that he was addressing him. He instantly insisted on us going to his private room, as he was at that time reading the *Dental News Letter* to get the idea how to construct some more of the forceps. The instruments were as ungainly, clumsy, and illy-adapted as they were useless. Whether an improvement resulted from our interview we know not; we cite this as an evidence that it is not worth while for a dentist to depend upon an instrument-maker, however good a workman he may be, to *adapt* his instruments, except the simplest kind. We might remark here, in passing, that we have not used bur-head drills for years. Perhaps the plugging forceps are not of use in as many cases now as before adhesive gold was employed, as it is now. It does not require as much force to pack adhesive gold, since a small portion is introduced at a time, and consolidated as the plug is made, as the non-adhesive, especially if it be introduced into the cavity in large quantities. Still we use them daily, and could not well do without them, as we save labor and time, and distress to the patient. Where it is necessary to operate rapidly to keep out of the way of the saliva, such as on the buccal surfaces of the molars, we find them invaluable. We also use them on the proximate surfaces of the bicuspids and molars, as well sometimes on the canines and labial surfaces of the incisors and bicuspids. It will not be out of place here to cite one case. A gentleman called to see us sixteen years since. He required a large plug in each of the three inferior left molars, and one on the right inferior. These teeth, he informed us, had been plugged several times, but the plugs would not remain in them more than from three to six months—they had been plugged with tin and sometimes cement. We plugged those teeth with gold in the old-fashioned way—large-sized rope; we *fixed* the plugs with an ordinary instrument, and then compressed them with the forceps. The saliva was all the time in the way, it flowed so rapidly. The teeth were very large and the plugs large. We have seen them once or twice a year since, and they are still good. Some dentists have remarked that the forceps displaces the gold from parts of the cavity to which it has been adjusted. It will do so if too much pressure is made on one point at one time. The late Dr. Townsend informed us that he could not use the forceps, as he could not *handle* them. We received, a few years since, a complicated instrument from France, with a number of *bits* to adapt to various positions about the teeth; but we do not use it, as it is too much trouble, and too complicated. Ours are seven in number and very simple. We can hazard the assertion here that if dentists generally were skilled in the use of the forceps, they would not find so much use for amalgam in difficult cases.

(To be continued.)

Entered, according to Act of Congress, in the year 1860, by Jones & White, in the Clerk's Office of the District Court for the Eastern District of Pennsylvania.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

BY DRS. CH. ROBIN AND E. MAGITOT.

[Translated for the Dental Cosmos, from the "*Journal de la Physiologie de l'Homme et des Animaux*," Dr. E. Brown-Séquard, editor, by E. Sureau.]

§ 3. *Structure of the germ of the enamel.*—We have already described the exterior anatomic disposition of the organ of the enamel, spread like a soft, gelatiniform lamina on the surface of the bulb, between the latter and the lower face of the follicular wall.* It now remains for us to determine exactly the intimate structure of this organ previous to and during the production of the enamel.

a. Texture of the organ of the enamel.

Considered comparatively in man and in the series of the domestic mammifers, the organ of the enamel exhibits in the various species such an analogy of structure that, excepting some slight differences in the size, form, and color of the elements of which it is composed, it is really impossible not to recognize in it a constitution always identical.

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* Hunter was the first to describe, with much exactitude, the exterior characteristics of the organ of the enamel under the names of *exterior pulpous substance* and *pulp of the enamel*, which does not appear very vascular, and adheres to the inner surface of the capsula. It secretes the enamel in like manner as a gland secretes its products, and in a liquid state—the latter crystallizes at the surface of the tooth just as it occurs in the production of the egg-shell, and in the biliary, vesical, and renal concretions. (Hunter, *Treatise on the Teeth.*) Since the time of Hunter, its existence has always been pointed out. Frederic Cuvier calls it the *membrane émaillante*, (*Dents des mammifères.* Paris, 1822, 8vo., pp. 22, 23.) Purkinje and Raschkow have described it very exactly under the terms *organon adamantinæ* and *organ of the enamel*, (*loc. cit.*, 1835,) as the *substratum of the formation of the enamel*, separated both from the follicular wall and from the bulb by a narrow space which should be full of liquid. These authors were the first to describe the star-shaped fibro-plastic bodies which enter into its composition under the name of *corpuscles bound together by fibres of the cellular tissue.* Purkinje and Raschkow also first pointed out the cellules called cells of the enamel, under the name of vertically juxtaposed fibres, which, when viewed endwise, appear like angular hexagonal corpuscles, forming by their entirety, between the bulb and the organ of the enamel, a bed, which, from its independence, may be called the *membrane of the enamel*, (*membrana adamantinæ.*) Henle acknowledges that this membrane of the enamel is entirely destitute of vessels, but he is incorrect in stating, as do many of his successors, that the *productive organ of the enamel* receives from the follicles of the vessels by its gingival surface. That organ is in this respect totally wanting. Previous to the time of Hunter the enamel was also called the *vitreous portion*, or the *cortical of the tooth.*

Two species of anatomic elements enter into the composition of this organ, viz.: 1st. Fibro-plastic bodies. 2d. Amorphous matter interposed between these fibro-plastic bodies.

CHARACTERISTICS OF THE FIBRO-PLASTIC BODIES.—The fibro-plastic bodies form the basis of the organ; they are remarkable for their star-shaped form, and the paleness and length of the prolongations, which, springing from every angle, spread across the amorphous matter. Resembling laminated fibres in their exterior appearance and their reactions, these prolongations sometimes terminate in a free end, after a course of one or more tenths of a millimetre, and they sometimes anastomose with those belonging to the neighboring fibro-plastic bodies, or else they advance directly upon the mass which surrounds the nucleus of the latter. They thus bind the fibro-plastic bodies to each other. These anastomoses and intercrossings form a reticulated web, the meshes of which are polygonal, with distinct angles; rarely rounded, and varying from one to several hundredths of a millimetre in size—the diameter being most generally from three hundredths to five hundredths of a millimetre. The configuration of these meshes when viewed in the mass gives this tissue a most elegant appearance. They are a little more compact near the *bulb-surface* of the organ of the enamel than toward its *follicular surface.**

The fibro-plastic bodies, from which arise the intercrossing laminated fibres, are themselves quite varied in configuration. Some are *fusiform*, as in many parts of the economy where the laminated fibres are developed; others are polyhedrical or star-shaped. The latter are much the most numerous in the tissue of the organ which is now under consideration; sometimes they are triangular prismatics, each angle being the point of departure for one or two laminated fibres; and sometimes they exhibit four or five angles from which spring as many prolongations or fibres, which give them a most elegant appearance. The diameter of these bodies is from twelve to twenty thousandths of a millimetre, and occasionally a little more in length. They are grayish, pale, and the outline, in particular, is sometimes not clearly marked. They are composed of a central nucleus, which is clear, finely granulated, with a distinct outline, sometimes, though rarely, provided with one or two nucleoles, and surrounded by a substance representing a body of cellules irregularly cut into a star-shaped polygon, and often into a triangle, with prolongations or intercrossed laminated fibres issuing from each of its angles. In consequence of this arrangement, the nucleus seems to be surrounded by a sort of grayish, granulated atmosphere, a little darker than the circumambient amorphous matter, and united to the neighboring fibro-plastic bodies by the prolongations of which we have just spoken.*

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* In order to be brief, we will, in indicating the seat of the organs contained in the follicle, use the term *gingival portion* for that part of the latter which adheres to the tissue of the gum, corresponding to the triturating or cutting surface of the tooth—a part which disappears at the time of the eruption of the tooth. We shall also use the term *alveolar portion* for that which, before eruption, surrounds the sides of the bulb as far as its adherent base—a part corresponding, on the other hand, to the alveolus, when the latter becomes determinate, and which, after the eruption, adheres to it as to the dental root when it is developed, thus forming the *alveolo-dental periosteum.*

THE AMORPHOUS MATTER.—The inter-fibrillary amorphous matter is abundant, and very pale; and it is to it, especially, that the transparency, elasticity, and gelatiniform consistency of the totality of the organ is owing.

This substance exactly fills the interstices between the fibro-plastic bodies and their prolongations. The whole mass is sprinkled with fine, grayish, molecular granulations, which are less numerous near the external or follicular surface than near the lower or bulb-surface, against which the prismatic cells adhere. In the neighborhood of this face, the star-shaped fibro-plastic bodies are, moreover, much closer, and sometimes they are even accompanied by free nuclei. These anatomic arrangements give the lower face a more compact texture than the other parts in a depth of from one to two hundredths of a millimetre.†

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* *Star-shaped* fibro-plastic bodies, more or less regular than those just described, with filaments intercrossed, anastomosed or not united, occur much more frequently in the economy than has heretofore been supposed. They are, indeed, found as the principal part of the basis of the lymphatic ganglions, of the spleen, of the other salivary glands, in many mucous membranes with a prismatic epithelium, etc.

† It is this modification of the texture of the organ of the enamel at its internal face which Hannover has described under the name of *membrana intermedia*, as constituting a particular and distinct membrane—which it is not—in such a manner that the cells of the enamel are placed vertically between it and the bulb at first, and afterward between it and the dentine; it forms, subsequently, at the surface of the enamel, the bed called the *cuticle of the enamel.* Hannover applies the same name and the same description to the analogous modification of texture exhibited by the internal face of the organ of the cement in those animals where it exists, and he considers it as blending without interruption with the preceding. (Hannover, *loc. cit.*, 1855, 4to., fig. 19, pp. 24, 30, 31, 125.) This continuity cannot be verified in any case. He asserts the fact of this continuity, as if the organs corresponding to the roots and to the dental crown coexisted, while they are in fact gradually developed one after the other. Hannover is thus led to say that, considered individually, the *membrana intermedia* does not belong solely to the crown or to the enamel, but represents a sacciform tissue, which is contained in the follicle in such a manner that the organ of the cement finds its place between the *membrana intermedia* and the follicular wall, where it afterward forms the homogeneous, finely granulated bed, called the *stratum intermedium*, which is seen between the ivory and the cement. Among those animals with the cement at the crown of the tooth, composed of folded laminæ, the *membrana intermedium* is situated between the inner face of the organ of the cement and the cells of the enamel; and afterward the *stratum intermedium*, which succeeds it, forms the limit between the

The face of the organ of the enamel, which is contiguous to the gingival portion of the wall of the follicle, is more adherent to the latter than the lateral parts. This adherence is not the result of a continuity of the elements of the wall in the tissues of the adamantine organ, but is caused by a more immediate contiguity and the mingling of the villiform vascular projections of the wall with the corresponding depressions of the latter.

These projections, which we have already described, are only to be met upon the point of the follicular wall which corresponds to the gingival insertion. Consequently, the organ of the enamel adheres more strongly to the wall in this place; and in the operation of isolating the latter from the neighboring walls of the follicle, we invariably bring away some of these villiform, vascular folds depending from the wall and penetrating into the corresponding depressions of the adamantine organ.*

It has been already stated in the present work, that the tissue of the organ of the enamel is absolutely without blood-capillaries and nervous filaments. In consequence of this the tissue can receive the materials of nutrition only by means of the follicular wall, the only part of the follicle to which it adheres, although simply by immediate contiguity.

b. Modifications of the organ of the enamel.

All the anatomic arrangements already described, as well as those which will be discussed hereafter, are found with identical characteristics after birth. In the second dentition it can be as readily traced upon the organ of the enamel of the follicles, under the form of a thin, transparent lamina between the follicular wall and the bulb; its non-vascularity is, then, established most distinctly in consequence of its situation between two organs which are already very vascular, the wall and the bulb.

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enamel and the cement. Todd and Bowman have named the same portion of the inner face of the organ of the enamel the *basement membrane* of the pulp of the enamel. (*Physiological Anatomy.* London, 1847, 3d part, 8vo., No. 175.

* The basis of the follicular wall, formed of fibres, either isolated or in small fasciculi, elegantly intercrossed in all directions, is readily distinguished from that of the tissue of the enamel, although these fibres also circumscribe, in the wall of the follicle, polygonal areolæ, having distinct angles, full of transparent amorphous matter, either slightly or not at all granulated, which is swollen by contact with the water. The laxity of the tissue has the effect of clearly exhibiting the capillaries, either empty or full of blood, and they can be isolated to a great length without difficulty. It is also apparent that the capillaries of the elongated loops, projecting into the villiform folds of the inner face, are surrounded by a sheath or adventitious, transparent, homogeneous, colorless, thin wall, similar to that which is around the capillaries of the pia mater and the brain. (Vide Ch. Robin, *Recherches sur quelques purticularités de la structure des capillaries de l'encéphale. Journal de Physiologie*, 1859, vol. ii. p. 537.)

In both species of teeth it extends to the contracted base of the coronal part of the bulb near to the place of adhesion with the follicular wall. It continues between the ivory and the latter until the epoch when the cap of dentine covers the whole of the coronal part of the bulb, and the formation of the dental roots is about to commence. But it decreases, softening more and more, and disappears when the gum, raised by the crown itself, becomes thin.

The organ of the enamel begins to soften and diminish gradually in thickness at the period when the development of the crown is so advanced as to cover the whole bulb.* It becomes viscous, semi-liquid, and threads like synovia. When we successively open from behind forward all the follicles of the jaw of a new-born infant, we find it more soft and ropy as we approach the middle incisors; while that of the tooth of a child of six years, or the first permanent molar, is still thick, firm, and elastic. It has completely disappeared by the time that the gingival mucous membrane is the only part which remains to open in order to give place to the eruption, and it disappears in the middle of the fifth year, in the first large permanent molar.

During this period of gradual attenuation fine, fatty granulations are being produced in the substance of the fibro-plastic bodies which surround the nucleus; but the tissue itself is not altered in texture. The meshes resulting from the anastomoses occurring between the fibres become a little smaller, but remain quadrilateral, pentagonal, etc., being regular and very elegant. Occasionally, at this period, the thin bed of the adamantine organ is removed with the follicular wall, from which it is easily detached. With its bed of cells, it has the appearance of a semi-transparent grayish pellicle, and the range of prismatic cells and the proper tissue can be distinguished in it by aid of the microscope.

The preceding developments of the intimate constitution of the organ of the enamel, independently of the absence of the vessels and nerves, show that the structure of the germ of the enamel is not analogous to that of the bulb. It is observable, also, that the tissue is much more compact, opaque, and darker in the bulb than it is in the organ of the enamel. Moreover, the bulb contains a large number of laminated fibres, and a considerable quantity of free, peculiar nuclei. The fibro-plastic bodies which are met here are generally simply fusiform, instead of being star-shaped, as they usually are in the organ of the enamel, and they are only found near the point of attachment, between the bulb and the follicular wall.

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* It is important to observe that, in the pachydermata and ruminantia, the preceding phenomena, and the decrease of thickness in the organ of the enamel, are manifested at first only in that portion corresponding to the gingival surface of the follicle, and particularly in the points covered by the organ of the cement. Also, at the time when the projections of the crown have already pierced the gum, the organ of the enamel is still found with all its characteristics, and with an epithelium upon the sides of the crown and of the follicular wall, and it continues there producing the enamel as long as the eruption lasts.

Sarcodic alteration.—We use this term for a peculiar cadaveric phenomenon, which occurs in the heart of the organ of the enamel, and is connected with its delicacy of texture. This phenomenon consists of an alteration which occurs, under the eye of the observer, between the two plates of glass, about twenty-four hours after the death of the subject, the time varying with the degree of elevation in the external temperature. This alteration is not restricted to the organ of the enamel; the germ of the ivory is also subject to it, although the latter offers a much longer resistance to the invasion of the cadaveric phenomena.

This alteration consists in the production of spherical vesicles around the embryo-plastic nuclei; these vesicles having the nucleus for their centre, and being remarkable for the perfect translucency and feeble refracting power of their mass, as well as for the distinctness and regularity of their outline. The alteration takes place quite rapidly, either in the air or in the microscopic preparations; and it occurs even in the heart of the follicle, where it causes the liquefaction of the organ, which then becomes detached like a light, flocculent cloud, when the follicular cavity is opened under water. The sarcodic alteration commences with the appearance of a limpid globule in contact with the free embryo-plastic nuclei, or with the nucleus of the fibro-plastic bodies. The globule is very small at first, but increases gradually, as if it oozed across the substance of the nucleus, and ends by surrounding the latter, as if with a fluid and transparent atmosphere. If the globules are isolated from each other at this period, by the addition of water, the free nuclei can be seen floating on one side with the rounded mass, of which they occupy the centre, (plate vi. fig. 1, *c*,) while the prolongations of the fusiform or star-shaped bodies are seen starting from the circumference of the sarcodic vesicle, and not from the neighborhood of the central nucleus, as before, (plate vi. fig. 1, *a*, *b*.) This alteration does not affect the laminated fibres which start from the fibro-plastic bodies, and continue anastomosed with each other. As we have already stated, this change does not take place with the same rapidity, either in all animals nor at all ages. It occurs very early in the embryo of the hog.

The production of these sarcodic drops is effected at the expense of the substance of the most part of the anatomic elements, which exhibit a certain delicacy of constitution. The amorphous substances, as well as the better defined anatomic elements, become the seat of this process of production as soon as they are affected by cadaveric alteration. The tissues of the embryos of all classes of animals offer frequent examples, but more especially, perhaps, in the organ of the enamel, and sometimes on the bulb, when still quite small; they are always in strict conformity with the phases of this order of alterations. Therefore, the small quantity of finely granulated, grayish amorphous substance, which surrounds the nucléus in the star-shaped or fusiform fibro-plastic bodies, and from which the prolongations spring, can be distinctly seen by the observer as it swells gradually, losing its granulations, and becoming spherical and homogeneous. It is remarkable that this is the fact, although the prolongations continue for some time longer to establish communications between the fibro-plastic bodies, now become vesiculiform; while in the amorphous substances, properly so called, the contiguous vesicles finally unite, and form a liquid mass.

If we have laid especial stress upon the subject of the sarcodic alteration of the organ of the enamel, we have done so because many authors, having neglected to follow, as we have done, all the successive phases of this accidental production, have considered it as a normal arrangement, in order to escape the consideration of the various causes of alteration in tissues of such delicate constitution and consistency.* These peculiarities are the more important, as it is usual to see these sarcodic drops produced at the expense of the amorphous substances, or, emerging by exudation from a mass of elements in process of alteration, to surround one or two nuclei, with or without molecular granulations. These drops, either isolated or united in a mass, bear more or less resemblance to limpid cells, of various dimensions, and are rendered spherical or slightly polyhedrical by reciprocal pressure, (plate vi. fig. 1.) It is especially important not to confound them with the cells, as their outline and dimensions cannot be perceived with exactitude at first sight, on account of their being still plunged in the masses of amorphous substance, or in transparent tissues, like that of the organ of the enamel.

(To be continued.)

ATMOSPHERIC-PRESSURE PLATES.

BY WM. A. PEASE.

THERE appeared in the December number of the DENTAL COSMOS an article by Dr. Allen, under the above title. As it evidently refers to, and is predicated upon an article of mine, in which I attempted to explain to the popular reader something of the nature of such plates, and the desirability, for dental purposes, of the different materials of which they are made, a few words upon the subject may not now be inappropriate.

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* Hannover, who has described the *proper tissue of the organ of the enamel* as being the organ of the cement, has pointed out some of the preceding cadaveric alterations under the name of *primordial cells of the germ of the cement*, yet liquid, taken in the follicles of the permanent incisors of a new-born child, (Hannover, *loc. cit.*, 1855, 4to., pp. 14 and 124, figs. 9 and 10.) But he is mistaken in considering them to be normal and special elements.

At the first view it seems to be unnecessary, and a work of supererogation, to discuss in a scientific journal for professional readers, those principles of natural philosophy involved in fastening a set of teeth to the roof of the mouth, which are taught and defined in every text-book upon that subject; and which, one could hardly ask a boy in his teens to explain, but he would be answered promptly, correctly, and to the point. But, as in the article referred to, the two forces, which, acting separately or conjointly, may be used to fasten a set of teeth to the roof of the mouth, are gravely and deliberately confounded, and treated as identical, and, as a true definition of them is of some practical importance, there may be a greater necessity for briefly adverting to them than was at first apparent.

Sets of teeth are now made for the upper jaw on two different plans, viz., those having a cavity or depression in the plate, called atmospheric-pressure or suction plates; and those without a cavity or depression, called plain ones. The principles involved in fastening these plates to the roof of the mouth, or the powers that sustain them there, are radically different and distinct. The first is held in its place by the direct upward pressure of the air, the other by the attraction existing between the plate and the roof of the mouth, called cohesive, or, perhaps, adhesive attraction. No two powers are more distinct than these, and none are better recognized or more clearly defined by philosophers. Theoretically, either plan is adapted for dental purposes, and will sustain a plate on the roof of the mouth, so far as adhesion to it, or remaining upon it when at rest, is concerned; but there are some practical difficulties that determine the choice of the manufacturer, and, in general, limit him to atmospheric-pressure plates. The plate being fitted, he has to add to it an apparatus to assist in pronunciation; to comminute the food; and to be more or less unfavorably affected by the muscles of the mouth, or the leverage produced by antagonizing with the lower teeth; and, also, to provide against unfavorable impressions of the wearer, who, in general, becomes more easily accustomed to, and learns to use a set quicker having a chamber than one on a plain plate, and hence it is the most satisfactory. There is something tangible and real in the sharp hold a suction plate takes on the roof of the mouth, and if the suction occasions a little pain, it is all the more convincing and satisfactory. An atmospheric-pressure plate is, then, one which is attached to the roof of the mouth by the pressure of the air upon it; a vacuum having been created in some place between it and the mucous membrane of the mouth, from which the air has been withdrawn. The chamber is generally made in the centre of the palatial arch. The sustaining power of the plate is measured (a good fit being always supposed) by the surface of the chamber exposed to the direct pressure of the atmosphere, and another power presently to be noticed. But the depth of the cavity must also be taken into the account; because, if too shallow, the tissues are immediately forced into and fill it, and it then becomes, practically, for the time being, a plain plate. As in all narrow and highly arched mouths, the chamber must be small, if used, the number of cases in which it can be much increased will be confined to the flat and shallow ones, where, if it is deep, it is in the way, and if it covers more than the usual amount of surface, it defeats the end intended, by having so little surface of plate resting upon the mouth that it is easily displaced by lateral pressure or motion. In all such cases there seems to be a proportion between the size of the chamber and the plate, that cannot be successfully passed. The plate, resting upon the arch of the mouth, should be two or three times greater than the chamber, in order to afford surface for cohesive attraction, and prevent easy displacement. On this account, notwithstanding the roofs of such mouths are the easiest to fit, and the direct atmospheric pressure upon them is as great, they present the most difficulties, and dentures made for them are the least satisfactory. While acknowledging the traction upon the roof of the mouth until these shallow chambers fill, people seem to think there must be something wrong or the sets would be more serviceable. They say they soon get loose unless frequently taken from the mouth; hence it will be perceived that nature abhors a vacuum, even in the mouth, and tries to destroy it and substitute in its place a plan that gives the least disturbance to tissue, and one that is the most natural and suitable to the parts; for although the plate is pressed upward and upon the roof of the mouth to such an extent that it is actually imbedded in the tissues, yet that part of the mucous membrane covered by the chamber is deprived of its accustomed support from the atmosphere, while the external pressure upon the surface of the body, and the internal upon the viscera, remain unchanged, which force the tissues down into the chamber by a pressure equal to that of the air upon its external surface. It is this downward or reflex pressure that at first gives pain, and it is often so great as to produce a local stagnation of circulation, or serous effusion. Hence the set of teeth may be said to hang upon that part of the mucous membrane forced down into the chamber, and that it taxes it to just the extent of the weight of the set, plus the external pressure of the atmosphere; and hence, it must be apparent that anything more than the minimum weight of a practical set of teeth must be to that extent appreciable, and create uneasiness if it does not actual pain. That this is so, every dentist must see at a glance. The philosophy of it is undeniable, and corresponds with and explains every day's experience. Take, for example, the testing of a plate when we are determining the fit. The patient exhausts the air from the chamber and he immediately complains that it hurts, it hurts very much; sometimes it is unbearable; varying with the texture of the tissue and its capability of resisting force; and he demands to be instantly relieved. Now, that pain or uneasiness is caused by violence or force; the movement or elevation of tissue is caused by force, a force as great as would be necessary to seize hold of and draw down the tissue to that extent; it can be caused by nothing else. Nothing moves without force, and to show that weight of plate is objectionable and a cause of uneasiness or pain, we have but to attach weights to the plate, and every pennyweight we add will cause additional uneasiness, and increase the pain. The reason of this is, the set is a tax of itself, and as the weight increases, it gradually overcomes the pressure of the atmosphere, the plate loses its hold or settles, which increases the depth of the chamber, increases the vacuum, and consequently increases the traction upon the tissue, not only in proportion to the increase of weight, but also an additional amount, equal to the increase of the size of the chamber. And this leads to the inquiry, how great is the pressure of the atmosphere upon a set of teeth, or, in other words, what is its sustaining power?

The weight of the atmosphere, at ordinary temperature and on the level of the sea, is about fifteen pounds to the square inch. In the mouth it is somewhat less, and it would be still further diminished on high mountains, so that a man wearing a suction plate, carries with him a kind of barometer. The atmospheric pressure upon a set of teeth is measured by the surface of chamber and not of plate. A cupping-glass or a thimble having the same superficial base as a chamber, the air being equally as well exhausted, would sustain the same weight vertical to its axis, but it would be more easily displaced by lateral pressure. All the advantage there is gained by a large plate consists in its greater ability to resist lateral displacement, and also, by what is gained by that other power called cohesive attraction, which Dr. Allen has so strangely confounded with atmospheric pressure. For we must recollect that a well-fitted plate will adhere very firmly to the roof of the mouth without a chamber; and a plate having a chamber becomes, practically, an adhesive-attraction one soon after it is inserted, unless the chamber is very deep, or it is frequently removed from the mouth, to enable the raised tissue to subside. If all plates could be fitted as perfectly to the mouth as a plaster impression, no one would think of making a chamber. It is the absence of weight and the nearer perfection of fit that are the most desirable qualities of rubber; and, notwithstanding some disadvantages, as at present made, they will make it more popular than continuous gum. How great then is the practical sustaining power of a plate? I answer, rarely more than ten or twelve pounds, and this cannot always be attained or relied on for actual use, by reason of the yielding nature of the gum.

The only time I ever did attach a weight to a plate it sustained ten pounds for a short time, but it hurt the lady so much, she refused to let me experiment further. This was in 1843*. I had made a set of teeth for her supported by spiral springs, which irritated her cheeks, and she was in my office to have them readjusted. While there, I saw a boy raise a brick from the walk with a leather sucker, such as was mentioned by Dr. Allen, when it occurred to me that if I could make a chamber in a plate that could be exhausted, I might, possibly, dispense with springs. I struck up a new plate over a piece of lead on the model, to form a chamber, and on trial it astonished me. I called in my friends to see it, and experimented as above narrated. It was the last of my spiral springs.

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* Since the above article was written, an editorial, by Dr. J. D. White, appeared in the DENTAL COSMOS, as a sequel to one in the number for November, in which he reiterated the opinion that the central cavity plate was devised by Mr. Gilbert, of New Haven, Connecticut. No doubt Dr. White had evidence satisfactory to him that the opinion there expressed was correct, and his generous nature was moved to do justice to a man who, probably, made the discovery as therein narrated. Of small moment as it is as to whom the origination of that plan belongs, if it should appear that it was devised by a dentist, it may as well be placed to dental account. Who originated it, I do not know; I only know that it was generally in use in Connecticut at a much earlier date than the time it was patented by Mr. Gilbert. As in the article above I incidentally mentioned I devised the plan in 1843, I wish now to state that I may have been in error as to the precise time I used it, which I can only determine in Connecticut. The first set was made in the village of Hitchcockville, Connecticut, a few miles from the residence of my father. I now find in my memorandum book of formulas that I was in that village in November, 1844, and it is possible the first set was made at that time. Not long after I had made it a lady, from the vicinity of Hartford, Connecticut, visiting a family near my father's, showed me a set made by Dr. J. M. Riggs, of Hartford. It was very similar to the one I had made, and surprised me much, as it showed I was not the sole possessor of the plan. At that day dentists were not as communicative as now. Soon after that I saw a set made, I think, by Dr. Horace Wells, but possibly by Dr. Crofoot, of Hartford, (I write from memory,) and in 1846–7 they were very common in that vicinity, having entirely superseded the use of spiral springs. In December, 1847, I came to this place, and made my first set here in March, 1848. When I heard that a patent had been taken out for that kind of plate, (I believe in May, 1848,) I was annoyed, fearing I might have trouble, and in one of my first visits to Connecticut, probably in 1849, I obtained one of my first sets and brought it with me, as I did not intend to surrender my rights. While in New York, on my return, I showed it to Dr. C. C. Allen, who said it was identical with Gilbert's, but that I need have no fear of molestation, as Mr. Gilbert had become satisfied he was not the first to use it. That set I kept several years, until about the time the patent was declared void by the United States District Court for Connecticut, at New Haven. As compared with the cut in the DENTAL COSMOS for November, the cavity was situated a little more in front, and the margin of it was less abrupt, as it was then thought it would be more comfortable and occasion less impediment to the voice; I have also been informed that Dr. Porter, of Bridgeport, Connecticut, also made sets on this plan at an early date. How any of these dentists came to use this kind of plate, I am uninformed, but I believe some of them claim to have used it before I did. While I am willing to believe that Mr. Gilbert devised the plan as described by him, and which bears his name, and perhaps justly, as being the first to call the general attention of the public to it, it is hard to reconcile his description of his diligent search for a dentist, who could make an atmospheric-pressure plate, with my knowledge of the abundance of those sets, equally as good as those made now, in the arc of a circle, of which New Haven is the centre, embracing Hartford, Hitchcockville, Winsted, and Bridgeport, Connecticut. The pressure of the atmosphere over a vacuum seems to have been applied to dental purposes by a number of persons in Connecticut at about the same time.

While some plates will sustain a weight of ten or twelve pounds for a very short time, I very much doubt if any ordinary, practical one will sustain five pounds in the mouth for one hour without re-exhausting the air, and even if it would, it would be a cause of suffering or pain to the wearer. Thus it will be seen that there is a difference between the actual sustaining power of a set of teeth by suction and the theoretical one of seventy-five pounds, as estimated by Dr. Allen. The difference is trifling, but then it is well to know that it exists.

As to the adhesion of the two pieces of plate-glass, the two pieces of polished marble, or the two halves of a bullet, common philosophical experiments in the schools, they result from adhesive attraction, or the attraction of the pieces for each other. It would be the same in a vacuum; the air has nothing to do with it.

Dayton, Ohio, January, 1862.

THE CAUSE AND PROGRESS OF CARIES.

BY C. N. P.

In the Dental Cosmos for January is an article, from the pen of Dr. King, of New York, and though not bearing the above title, yet treating really upon this subject. The following positions are assumed :—

1st. That a general belief among members of the dental profession is, that one decaying tooth will infect another, or even *both* its immediate neighbors. 2d. That the enamel covering the crown is not susceptible of decomposition from any condition the fluids of the mouth may assume, and hence decay must necessarily commence from within and work externally, instead, as has been long supposed, from without and extending inward.

In reading over the essay, the following thoughts have been suggested: The cause of caries has been variously estimated by different individuals, also differently estimated by the same individual at different periods of life, and for the reason that every honest seeker after truth must vary his convictions with the development of new facts which experience and research are constantly bringing into view.

The theories which have been advanced may be arranged under the three following heads: 1st. Caries considered solely as a vital action, and the result of inflammation. 2d. As the result of chemical action. 3d. The result of a chemico-vital action, or of a constitutional or predisposing and local or exciting cause.

Fox and Bell have in their works endeavored to show that dental is in nature similar to osseous caries—assuming that separation of the periosteum is the cause of caries in the bones, and that separation of the pulp from the surface of the pulp cavity is the cause of dental caries. Mr. Robertson, of Birmingham, and others, have maintained directly opposite opinions, assuming that the tissues composing the teeth are devoid of life, and that therefore vital action cannot occur in them, and hence that caries is nothing more than chemical decomposition of the tooth; while Mr. Tomes, and other eminent practitioners of the present day, assert and ably sustain the idea that caries is the death and subsequent progressive decomposition of a part or the whole of a tooth, and that this death of a part or the whole may be the result of some local and external irritant, or of some internal or constitutional disturbance.

That when decomposition follows, it is *always* from without inward and the result of some corroding agent, the enamel being the first to suffer and then the dentine, but not till then, the constitutional defects always acting as a predisposing cause, by giving us enamel and dentine imperfect either in density, quantity, conformation, or vitality; also a crowded and irregular condition of the teeth, rendering them more difficult to be kept clean, and hence more liable to be unfavorably acted upon by a vitiated condition of the secretions of the mouth.

This abnormal condition of the saliva may be the result of ill health and its attendants, improper diet, want of cleanliness, or the presence of some foreign substance, such as tartar, or an ill-adjusted, partial set of artificial dentures; but however caused, it is certain that before caries can be developed in the teeth, the agent must be of such a nature that when it is brought in contact with, and retained any length of time, it will decompose their tissues, and not only the dentine and cementum, but the enamel also. While dental practitioners of the present day differ widely on much that concerns dental surgery, they agree in this one important point, that the decomposition of the tooth goes on from without inward; that the enamel is always the first to give way, though it may be but slightly, still sufficiently for the fluids of the mouth to permeate and be brought in contact with the dentine beneath.

Although this theory should be pretty thoroughly established by the experience of dentists of the present time as well as of the past, it does not prove "that one decaying tooth will infect another or even *both* its immediate neighbors;" and I cannot help thinking that the author of the article above referred to must either be limited in his acquaintance with members of the dental profession, or misinformed as to their views, if he thinks this last idea is one generally entertained by them. Now all the influence that it is claimed a decaying tooth has upon those approximating it, or upon the mouth generally, is simply that the cavity formed by the decay retains within it, and in contact with the adjoining tooth, such portions of food as have there become deposited until they become vitiated, or are so changed as to have a deleterious effect upon their approximal surface, or to so modify the secretions as to operate in a general manner unfavorably upon the other teeth. That the decay itself, independent of the surrounding fluids, can have any injurious influence upon the approximating teeth, I have reason to think is believed by but few. But let me not be understood as ignoring the fact that when decay is found on the lateral surface of one tooth, the approximating surface of the adjoining one is frequently found in the same condition; and, if equally well developed, and maintaining their normal condition with regard to vitality, they may be similarly decayed — not that one has *caught* the decay from the other, but because they are alike situated in the mouth and exposed to the same irritating and corroding agent. Another condition familiar to every dental practitioner is, that corresponding teeth on opposite sides of the mouth are frequently similarly affected with caries, and for this reason, teeth are developed, as a general rule, in pairs, and any systemic derangement that would produce structural defect in the enamel of one tooth would affect its mate on the opposite side of the mouth in the same manner, providing it was in the same stage of development. The teeth would, of course, be similarly predisposed to decay, and being surrounded by the same decomposing agent, would be equally operated upon. Any one desirous of tracing this predisposing cause of caries to its origin, can readily do so by familiarizing himself with the average time of the various progressive stages of development of the teeth, and when they meet with children whose teeth are imperfectly developed on their buccal and labial surfaces, or on masticating surfaces of molars and cutting edges of incisors, can, by noting the situation and extent of defect, tell within a few months of the time the child had suffered some constitutional derangement, which was of sufficient importance to interfere materially with health and nutrition.

Let me now direct attention to those portions of the tooth which are most frequently attacked by caries, and see if we shall not *always* find them where, either from conformation of enamel or situation of crown, the food and saliva are retained longest in contact. Take, for instance, masticating, buccal, and approximal surfaces of molars and bicuspids; on the masticating surfaces of these teeth there is always a fissure, varying in extent with the different teeth, as in the inferior molars we have it a crucial shape extending across the crown, and sometimes connecting with a slight fissure on the buccal surface of the tooth. On superior molars a similar fissure is divided into two depressions or concavities, and frequently extends in the same manner to the depression on the buccal surface. In the bicuspids the fissure extends across the crown between the two cusps, varying in its depth in different teeth; the anterior and posterior surfaces of these teeth frequently approximate each other so closely that the particles of food which are forced between them during mastication are there retained until removed by a tooth-pick, brush, or decomposition. Now when either of these teeth is decayed, it is invariably in one or all of the points specified, and on examining the decay in its incipient stage, the shape of the cavity and the progress of the disease give unmistakable evidence of decomposition having commenced externally. Take, for instance, a cavity in the fissure on the masticating surface of a molar tooth. We find in the cavity in the enamel the walls converging toward the inner surface of that tissue. As we follow the progress of the disease in the dentine we find the same peculiarity; that is, the greatest destruction of dentine nearest the external surface, with the disinfected walls again converging toward the centre of the tooth.

Now, one word as regards the source of the destructive agent. The author of the article above referred to is doubtless aware that there are circumstances arising under which the saliva is strongly acid; also, that an acid is not unfrequently eructated from the stomach, and in addition to these, more or less acid is in connection with the food daily brought in contact with the teeth. If any one wishes to test the presence of this corroding agent, he can readily do so by applying a piece of litmus-paper to the cavity where decay is rapidly progressing. The writer of the article to which we have referred says, "the microscope has revealed that the enamel has no capillaries that could possibly transmit the fluids of the blood, therefore it is *purely* an inorganic body subject to neither nutritive nor destructive assimilation." The microscope has also proved that the enamel is composed of hexagonal fibres placed side by side, which, owing to improper nutrition, are often imperfectly united, while chemical analysis proves that enamel is *not* purely an inorganic body, but contains nearly four per cent. of organized matter, while hundreds of specimens are daily presenting themselves to the dental profession, proving without a shadow of doubt that enamel, on losing its vitality, materially changes its color, and that on being removed from the mouth and thoroughly dried, will, on being placed in contact with moisture, absorb it to a greater or less extent through its external surface.

From these facts we learn that the fluids of the mouth may permeate the substance of a tooth if there be no vital action to oppose their doing so; and, supposing them to have permeated, they may, if they be of an active character, and there be present no restraining power, decompose the tissues. "As the solvent enters from without, the enamel and the more external parts of the dentine are the first affected. Again, the fluid finding a ready passage through the tubuli of the dentine, travels inward toward the pulp cavity, contracting in its extent as the tubes converge."

The Doctor appreciates one fact when he says that "the nerves distributed to one or more teeth may become irritated while the crowns of those teeth remain perfectly sound," and the cause of that irritation may be an exposed nerve, a necrosed tooth, or an exostosed fang in another part of the mouth, giving no local pain, yet making the sound teeth quite sensitive to hot and cold fluids; but he falls very far short of a *fact* when he assumes that "this irritation may cause two or three teeth to decay inwardly." All that the irritation can do is this, if the cause is not removed it may tend to inflammation and terminate in suppuration, the crown of the tooth in that result losing its vitality, and hence its most efficient means of protection against the external corroding agents.

PHILADELPHIA, PA., January, 1862.

ARSENIC.

BY GEO. W. ELLIS, M.D.

THE application of arsenious acid for the destruction of the dental pulp presenting itself to me as a matter of unusual interest, I was led, partly from curiosity and partly from a desire to refresh my memory, to institute a comparison between the views of different writers upon this subject, and was struck with the discrepancy of opinion entertained by gentlemen all occupying enviable positions as authors in our science.

In an ever-varying and progressive science like that of dentistry, we can scarcely expect to find the doctrines formerly promulgated corresponding with those of more recent origin; and, in fact, we not unfrequently find them directly antagonistic; yet, making all due allowance for any difference which might be attributed to such cause, it is really astonishing when we observe the widely dissimilar results obtained by different gentlemen in the use of the same material, and apparently under the same circumstances. This is so much the case with respect to the use of arsenic, that an impartial person, desirous of information and consulting our various authors upon the subject, would be led into a maze of theories which, rather than elucidating, tend only to render it more intricate and perplexing. In order to verify the statements I have made, I will take occasion to introduce, in juxtaposition, some quotations from different authors on the use of arsenic, the method of its application, and the results likely to accrue from its employment.

Although the use of arsenic at first, like all innovations, met with considerable discouragement, it is now the almost universally adopted medium for the destruction of the dental pulp, and, in skillful hands, is thought to be divested of the many dangers which have been attributed to it; yet there are some practitioners who still adhere to the old and barbarous method of broaching a living and healthy nerve. With regard to the method of using arsenic, we will first quote from a gentleman who has contributed much toward the advancement of his profession, viz., Dr. Arthur, on pages 82 and 83 of his "Manual of Diseases of the Teeth," where he says:—

"In applying the arsenic to the tooth for the purpose of destroying the pulp, this body should be fully exposed. The preparation used most successfully for this purpose consists of about the twentieth part of a grain of arsenic ground in creosote, to which is added the same quantity of sulphate of morphia. But if the pure arsenic were applied to the exposed pulp, the most excruciating pain would be developed, violent inflammation of the membranes within the socket would follow, ending in the entire destruction of the tooth."

Dr. Taft, however, would seem to disagree with this assertion, since, on page 240 of his "Operative Dentistry," he says:—

"The morphine is used for the purpose of diminishing the pain which frequently results from the application of arsenic; but its influence for such a purpose is predicated more on theory than on practice; for facts prove that, applied to living tissue, it produces pain rather than allays it; therefore the more observing and better class of practitioners have discarded it."

This view is somewhat substantiated by Mr. Tomes, an English writer of much celebrity, who, in his work on "Dental Surgery," page 483, says:

"Some practitioners prepare a compound, made by grinding together equal parts of arsenic and morphia, the narcotic being added for the purpose of mitigating the pain produced by the corrosive action of the mineral substance. In my own practice, I prefer to use the arsenic alone," etc.

Dr. Harris, however, whose vast labors in our profession have earned him the well deserved title of "The Father of Dentistry," says, in his "Principles and Practice of Dental Surgery," page 340:—

"When he uses arsenic he applies about the thirtieth or fortieth part of a grain, with an equal quantity of sulphate of morphia, on a small particle of raw cotton, moistened with water, creosote, or spirit of camphor," which practice is very similar to that advocated by Dr. J. D. White, in his "Practical Hints," in the Dental Cosmos of September, 1859, who uses an arsenical paste, prepared according to a formula containing arsenious acid, sulphate of morphia, and creosote.

Although there is such a great difference of opinion with respect to the manner of using the arsenic, there is a greater uniformity concerning the amount required to accomplish the desired effect, viz., the destruction of the pulp. By reference to the above-named authors we find that, in whatever form the agent may be applied, it requires a proportion of arsenic varying from the fortieth to the twentieth of a grain to each application, although we may meet with occasional idiosyncrasies requiring a trifle more or less.

The time the material should be allowed to remain in contact with the pulp is the next point to be considered, and here, again, we find much that is conflicting between the views of different authorities. Dr. Harris, on page 340 of his work on "Principles and Practice of Dental Surgery," says that "at the expiration of about seven hours, or two hours after the tooth has completely ceased aching, he removes the wax and arsenic, and afterward the pulp of the tooth." Dr. Taft, however, considers, page 242 "Operative Dentistry," that "the length of time the preparation should remain in the tooth will be determined from the condition of the pulp when it is applied, the age of the patient, the vascularity of the dentine, the susceptibility of the patient to the influence of arsenic, and the like circumstances. It will usually be from three to twenty-four hours." Mr. Tomes, in his "Dental Surgery," page 484, says: "After the lapse of some twelve to thirty-six hours, depending on the size of the tooth and the extent of surface exposed to the action of the escharotic, the whole of the cotton-wool may be removed and the effects of the application ascertained." Dr. White, in the article previously mentioned, says: "As a general rule, we now let the paste remain for thirty-six or forty-eight hours."

In comparing these extracts, we find three hours to be the least time in which arsenic will effect destruction of the dental pulp, and forty-eight hours the greatest time it can be allowed, in the generality of cases, to remain with safety; the operator being expected to be sufficiently acquainted with the peculiarities and susceptibilities of each individual case to enable him to select from the intermediate range the time applicable to such case. If on the removal of the arsenic the part be still sensitive, the renewal of the application is the practice mostly advocated.

The foregoing remarks are submitted with the view of exhibiting the great confusion to which a consultation of our different authors upon the subject is likely to lead; and as "arsenic" at present seems to be commanding a considerable share of the attention of the profession, it is hoped that some gentlemen of extended experience may be induced to give us their views in relation to the use of this agent at the present time.

PHILADELPHIA, PA., January, 1862.

DENTAL DISPENSARIES.

BY H. MEREDITH WHITE, M.D.

DISPENSARIES for diseases of the teeth have never, to my knowledge, been established in this city, and probably not in this country. It is true, the dental college of this city, and those of other cities, have a dental clinic once or twice a week, and that gratuitous operations are performed there at other times; but these opportunities are insufficient for the alleviation except of a small portion of the cases needing attention, so great is the class of people who are really unable to give their teeth the proper care for want of pecuniary means. The charity of the richer portion of the community has extended in all directions, except in the establishment of dental dispensaries. The amount of suffering caused by the want of this means of relief is very great. It would be an act of charity if some of the benevolent citizens of this and other cities would take the trouble and time to help to establish places of the kind, and see that they are carried on in a proper manner. It would not take much money to do this; the amount of suffering prevented or relieved would fully indemnify the charitable for their outlay in this direction.

In England it seems that they are progressing much faster in that direction than we are. There are several dental dispensaries established. One in particular, called "The Birmingham and Midland Counties Dispensary for Diseases of the Teeth." It seems to be doing a great deal of good; the dentist to it is Mr. Samuel A. Parker; the consulting dentist, S. R. English, Esq.; president, Sir John Radcliff. The prospectus reads thus: "This institution is founded with the intention of affording gratuitous advice and assistance to the poor in all cases of diseases of the teeth, such advice and assistance to include the operations of extracting, stopping, and scaling, and the regulation of children's teeth." The rooms are "open every Tuesday, Wednesday, and Friday mornings, from nine till ten o'clock," at No. 13 Temple Street, Birmingham. The institution has been in operation nearly four years, and reports considerable improvement. For the year ending December 31, 1860, total number of patients relieved was 1638; number of operations performed, 2921. Near the end of the pamphlet there is a notice that "subscriptions and donations will be thankfully received," from which it is evident that a certain amount of money is necessary to carry on an institution of the kind. A few months ago there was a dental department attached to "Charity Hospital," in Buttonwood Street, below Broad Street, Philadelphia. As yet the fact has not become known to any extent to the community; but much relief has been afforded to the few patients who have called for the purpose of obtaining it. The room for dental operations is open every Friday, at one o'clock P.M. As soon as the number of cases warrants it, the room will be open twice a week.

At present the operations embrace extracting, scaling, treatment of nerves, alveolar abscess, regulation of the teeth, diseases of the gums, etc.

The operation of plugging teeth has not been performed for want of material. The institution is somewhat crippled for want of funds. It would, however, take but little pecuniary aid to put it in a flourishing condition. A great deal of good has been done, however, notwithstanding the depressing influences of the times.

This is probably the first hospital in the United States that has a dental department. It is a move in the right direction, and if properly carried on will be productive of much good. There is room for others in this city. And each dispensary and hospital should have attached to it a dental department. And probably, in a few years, there would be occasion to establish dispensaries devoted exclusively to diseases of the teeth. This would in no way interfere with the dental colleges, as they are open only for a limited period of the year.

PHILADELPHIA, Pa., January, 1862.

A CASE OF FRACTURE OF THE INFERIOR MAXILLA, AND ITS RESULT.

BY DR. L. A. RHODES.

MY attention was called, November 18, 1861, to E. J. Wait, aged twenty-eight years; of good constitution; was attacked with pain in the right inferior dens sapientia about the first of July last. He called upon a dentist the next morning to have it extracted. In making the effort the tooth was broken off even with the surface of the alveolar process, but by a subsequent, and, using the patient's language, "a brutal effort," made with the turnkey, the roots were removed, and in the operation an extensive fracture occurred. The patient's expression was, "I thought my face was broken to pieces." Inflammation immediately followed to such a degree that the patient was unable to labor, and was mostly confined to his room. Suppuration soon followed, and, according to the patient's and his friends' account of the matter, he discharged from a half pint to a pint of pus every twenty-four hours. He had become exceedingly enfeebled and reduced at the time I first saw him. On examination, I found a large piece of bone separated from the jaw, extending nearly to the ramus. I ascertained that it would be impossible to remove it without extracting the next tooth. He readily assented to its removal, although it was a sound tooth, in order to obtain relief. I proceeded at once to remove the tooth, and, by making an incision about two inches long above the margin of the jaw, I was enabled to introduce the forceps and remove the bone. I found it to be one and one-half inch in length, one-half inch in thickness, with a very ragged surface. The patient bore the operation with great fortitude, and expressed great gratification at the relief it afforded him. He called at my office the next day, and said that he felt like a new man, that the pain and suppuration had almost ceased, and that he felt every way comfortable. He continued to improve for three days, up to November 21st, when he was taken with diphtheria or putrid throat. The swelling and inflammation entirely disappeared from the face; the discharge entirely ceased; the throat and neck badly swollen, with intense pain and suffering. The patient died on the twenty-seventh, calling upon God to relieve him of his sufferings by death.

NORWICH, N. Y.

ETHER AND CHLOROFORM.

BY C. B. FOSTER, M.D.

In the last number of the Dental Cosmos, allusion is made to the fact that while chloroform is preferred in Europe as an anæsthetic, it is regarded in our own country as more fraught with danger than ether; and the question is asked, whether "this apprehension is well grounded?"

Having employed both agents somewhat extensively since their first introduction, I would state, as the result of my experience, that chloroform is the one most to be relied on for the production of complete anæsthesia. Its action upon some organisms, however, is so prompt that great caution is *always* required. In some cases five or six inhalations will produce entire insensibility. Its effects also appear to be accumulative, patients often being more unconscious some minutes after than at the moment of its withdrawal. Under its influence, at times, the circulatory and respiratory functions are interrupted to an alarming and dangerous, if not to a fatal extent. Ether is less prompt and persistent, and is not liable to exert so unfavorable an influence upon the action of the heart and lungs. In the hands of most persons it is undoubtedly *less* dangerous than chloroform.

Like most medicinal agents, ether and chloroform act differently on different persons. Upon some ether does not operate as an anæsthetic; in such cases chloroform will generally accomplish the object.

When not acquainted with the susceptibilities of the patient, it is not well to administer chloroform, except as a last resort, when ether has failed to produce the desired effect.

The injurious effects of chloroform, to which reference has been made, may be avoided almost wholly, if care be taken to admit a good supply of atmospheric air. By attention to this, the patient may be brought under its influence so gradually that the operator will be enabled to withdraw it upon the first manifestation of unfavorable symptoms.

ARSENIC.

BY H. MEREDITH WHITE, M.D.

In the *Dental News Letter*, vol. vi. No. 4, July, 1853, and in the following number, there is published a Thesis on the Treatment of the Dental Pulp, by Dr. J. D. White, which includes the use of arsenic, and is probably the first time that the recipe of arsenical paste was made public. The thesis was written and submitted to the Faculty of Jefferson College for the degree of Doctor of Medicine in 1843-4. The doctrines advanced in the paper are still adhered to, and are, no doubt, the best that have been published on the subject, and may be said to be the modern practice. The paper was also published for circulation in pamphlet form, by the firm at that time, consisting of Jones, White & McCurdy.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of January 14th, 1862, at eight o'clock.

President, Dr. T. L. Buckingham, in the Chair. Present, Drs. Harris, Flagg, McQuillen, Van Osten, Garretson, Peirce, Dixon, Githens, Fitch, Hopkins, Ellis, Townsend, and Barker, and the class of students in attendance at the Dental College.

The President stated the subject for consideration to be the

COMPARATIVE ANATOMY OF THE TEETH.

The subject was opened by Dr. McQuillen, who said that the gentlemen present would remember that he had, on different occasions during the past two years, desired the members of the Association to investigate the "COMPARATIVE ANATOMY OF THE TEETH," but it had been postponed from time to time, because they had, what was regarded by some, more practical matters to discuss. His object in advocating its consideration, had been to furnish a stimulus to investigation for himself, as well as to induce others to take an interest in a subject which had not been as thoroughly studied by the dental profession as it should be. They were too much disposed indeed, he said, to depend upon the labors of purely scientific men for their knowledge of a matter which demands attention at their own hands, and which was well worthy of serious and prolonged investigation; one, too, that opens a wide and extensive field, which, by no means, could be regarded as exhausted.

In one of a series of interesting and instructive papers on "Methods of Study in Natural History," Agassiz, whose contributions to science are so justly prized, alluding to how small the sum total of the work accomplished by the most eminent naturalists in a lifetime amounts to, with a modesty worthy of imitation says of himself, that although his whole life has been devoted to the study of nature, "a single sentence may express all that I have done. I have shown that there is a correspondence between the succession of fishes in geological times and the different stages of their growth—this is all."

As Agassiz very justly remarks, however, this should not discourage others from entering upon such studies. It may not be the privilege of all to add to the general stock of knowledge, but they can at least make themselves acquainted with what has been contributed by others. As the members of a liberal profession, whether we enter upon the broad domain of nature or not in our studies, we should at least esteem it a privilege and duty to master the comparative anatomy of teeth as our specialty.

In opening this subject he said, in reference to the entire animal scale, teeth might be very properly defined as hard organs situated on the inner surface of the digestive canal, varying in shape, size, and location with the character of the food of the animal. Of the four great divisions of Cuvier, the *Vertebrates* are, properly speaking, supplied with teeth, there being but one exception to this in the *Radiates*, a few in the *Articulates*, and none in the *Mollusks*.

The dental tissues are usually described as three in number: *enamel*, *dentine*, and *cementum;* in addition to this, a microscopical examination of the teeth of the entire animal series reveals two additional structures, *vaso-dentine*, and *osteo-dentine.* We invariably speak of *enamel* as being placed externally, or, in other words, on the outside of the crown of the human tooth; *dentine* as the internal substance forming the body of the tooth; and the *cementum* as the tissue investing the fang or root. It is a well-attested fact, however, by those who have made this a subject of observation, that the *cementum* covers the *enamel* of the human tooth in the same manner that it envelops the crowns of the teeth of many animals; but it can only be found for a short period after eruption, as it is soon worn off.

The microscopical characteristics of *enamel*, *dentine*, and *cementum* of the human teeth had so often been described by himself and others in the Association, and the members were so well acquainted with them, that he would not occupy their time and attention in that direction, but pass at once to the peculiarities of *vaso-dentine* and *osteo-dentine.*

Vaso-dentine differs from *non-vascular human* dentine in the fact that the calibre of its dentinal tubuli is much larger, and the capillaries of the pulp pass through some of them carrying the red corpuscles into that structure. Although the *vaso-dentine* is not found in the human economy, it is presented in the teeth of certain extinct animals belonging to the paleontological periods, and also in the incisors of some of the Rodentia, in the tusk of the elephant, and in the teeth of many fishes.

Osteo-dentine bears a very close resemblance to true bone, the *lacunæ* and *canaliculi* being very well marked in it. This tissue constitutes a large part of the teeth of many fishes, and Owen states that in the teeth of old persons, where the pulp cavity has been obliterated by the gradual calcification of the pulp, that portion of the tooth will be found to present the characteristic *lacunæ* and *canaliculi* of bone, and therefore calls it *osteo-dentine.* Dr. McQuillen had never seen this central substance presenting the marked characteristics of bone, but would not pretend to say that such an accurate observer as Owen could have been mistaken in that particular.

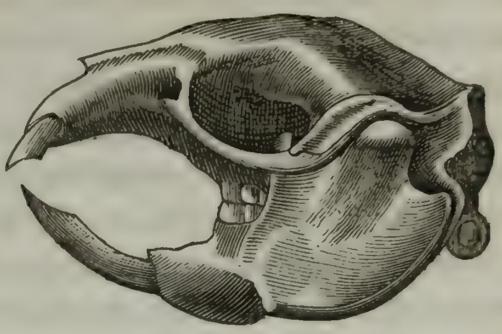
Passing from the consideration of structure to use, it is found that the teeth are employed by many animals as offensive and defensive weapons; by others as means of locomotion; thus the walrus, by means of their tusks, are enabled to drag themselves over the hummocks of ice; again they are used by certain kinds of fish in crushing the stony shells inclosing their food. Wherever found, while they may subserve other purposes, they are invariably necessary agents in the comminution of food. With man they subserved the purposes of mastication, speech, and appearance.

Although man and several of the animals have thirty-two teeth belonging to the permanent set, the typical number of the *Vertebrates* is forty-four. As already stated, these organs are confined almost exclusively to this class; many of the divisions, however, are edentulous or without teeth; others have but one tooth, and from this they range upwards to such a large number that to those who have not examined the subject, it must appear incredible. Thus we find at one extreme birds, of course invariably edentulous, the gizzard serving as the comminuting organ, while, at the other extreme, fishes are supplied in the most liberal manner with teeth. In many of the *Vertebrates* the teeth are firmly implanted in the maxillary and premaxillary bones. In other cases, as in certain kinds of fish, the teeth are inserted not merely in the maxillary and premaxillary bones, but in the palatine bones, vomer, pharynx, on the tongue, in the stomach, and in fact, in every direction, being so numerous, and in such peculiar positions, that it is quite difficult to count them, running as high as one hundred and forty in some, and in others to one hundred and ninety, and beyond.

With these general remarks, which had been made as brief as possible, as he did not wish to trespass too far upon the patience of the members, he would state that in accordance with the suggestion made by Dr. Flagg, at the last meeting, that each member should take up one animal and describe its peculiar characteristics, he had selected a family, the *Ruminantia,* as there was a very slight difference in the teeth of the entire group. Having been unable, however, to get together all the specimens which he required in illustration of his investigations for this meeting, he would be compelled to defer his remarks in that direction for the present, and therefore would take up a group known as the *Rodentia,* or gnawers, from their proclivity to gnaw hard substances.

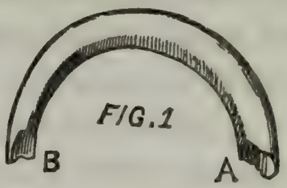
This group constitutes quite a large family, and includes the Beaver, Porcupine, Marmot, Rabbit, Hare, Squirrel, Rat, Mouse, etc. The habits and food of the various members of this group differ very much, but the modifications in the form, number, and arrangement of their teeth is very slight. Owing to the peculiarities of diet and habits, a portion have been classified as herbivorous, and the remainder, from their disposition to consume or destroy everything that they meet with, as omnivorous.

The dental arrangement of the Rodentia usually comprise four *incisors* and sixteen *molars,* making in all twenty teeth. In a few genera the *molars* are less in number, in others they are greater, ranging from twelve to twenty. None of this family, however, are supplied with *canines*, and there is invariably quite a large space between the *incisors* and *molars*. In the entire group, we find that the superior and inferior *incisors* are curved, the upper describing the arc of a small circle, the lower ones the arc of a much larger circle.



ULL OF A RAT.

The root of each *incisor* is very long, and deeply implanted in its socket; the upper *incisors*, Fig. 1, situated in the premaxillary bones, however, are not as long as the lower, Fig. 2, which extend from the front to the back part of the under jaw. The pulp cavity in this portion of the tooth is quite large, and occupied by a highly-vascular pulp, which undergoes a rapid centripetal calcification or conversion into dentine. Owing to this fact, during the entire life of the animal the teeth are constantly growing, or being pushed as it were from behind forward. This constant growth is necessary to compensate for the continued loss sustained at the cutting edge of the teeth by attrition against hard textures such as the bark, and roots, and woody fibres of trees. These are the agents employed by the beaver in felling the trees used in the erection of its hut.



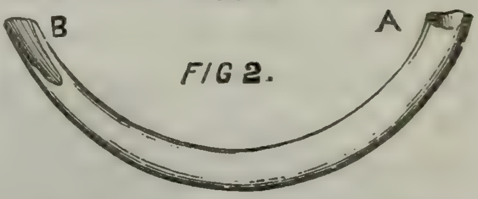
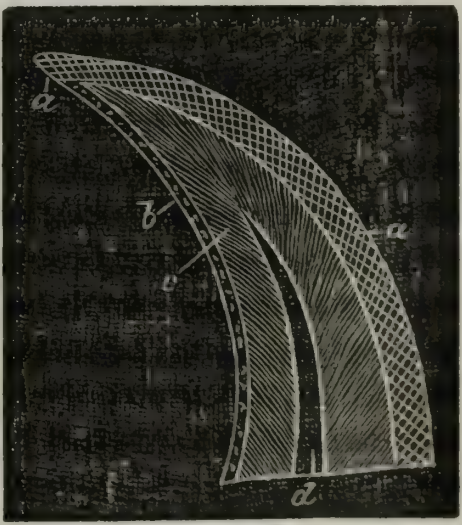


FIG. 1.—UPPER INCISOR OF A RABBIT.
A, root. B, cutting edge.

FIG. 2.—LOWER INCISOR OF A RABBIT.
A, root. B, cutting edge.

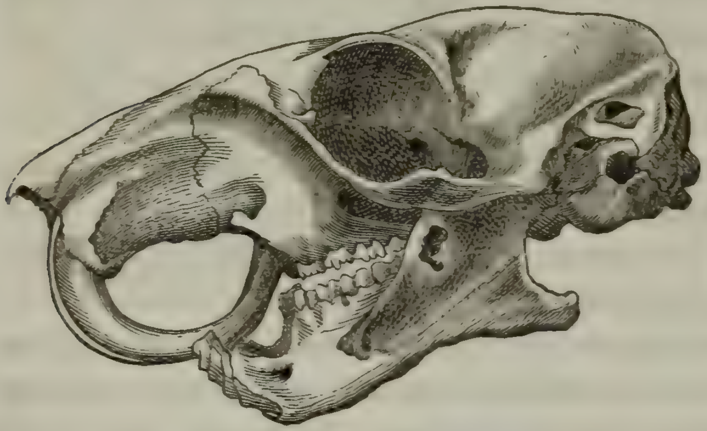
At their cutting edge the *incisors* are very sharp, and shaped like a chisel, the bevel being on the inner side; the oblique surface thus presented is due to the wear and tear incident to use, and to the fact that the front portion of the tooth is composed of two layers of *enamel*, the external being the densest; back of the enamel is a large portion of compact *dentine* with a thin layer of *cementum* covering the inner or concave surface of the tooth. Under such circumstances it is easy to understand how the teeth are kept so sharp; the *cementum* and *dentine* being softer than the *enamel*, of course wear away much faster by use. A fair idea of



MICROSCOPICAL SECTION.

the arrangement of the different tissues composing the incisor of the Rodentia might be formed from the diagram he had made on the blackboard, which was taken from Goadby, and represented a longitudinal section of the incisor of a rabbit. The enamel, *a*, is seen covering the convex surface and forming the chisel-shaped edge, the cementum, *b*, constituting a very thin coating on the concave surface, and between these two tissues is the dentine, *c*, with the pulp cavity, *d*, in the centre.

The law of unlimited growth manifested in these teeth makes it imperatively necessary that they should be kept well cut down by gnawing hard substances, or the animal would soon be unable to use them on legitimate articles of food, and die of starvation. If the animal should be so unfortunate as to lose an upper or lower incisor, the tooth opposite to the one lost failing to meet with an antagonist, there is nothing to interfere with its increase in length, and it continues therefore to grow, and following the curve prescribed by its socket eventually forms a perfect ring. In doing this the cutting edge frequently comes in contact with the gum, passes through it, and produces absorption of the jaw, as in the specimen presented. In this specimen, the skull of a gray squirrel, the property of Dr. J. Foster Flagg, the lower incisors have been broken, and the superior failing to meet with antagonists have formed a complete circle, and penetrated the upper jaw just in front of the molar teeth. Professor Owen states that in the museum of the College of Surgeons (London) "there is a lower jaw of a beaver, in which the scalpriform incisor has, by unchecked growth, described a complete circle; the point has pierced the masseter muscle, entered the back of the mouth, and terminated close to the bottom of the socket containing its own hollow root."

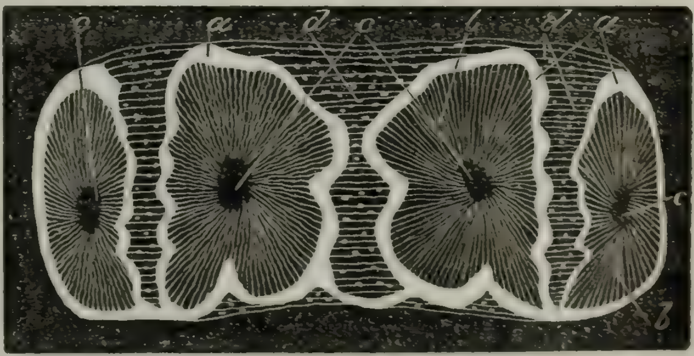


The peculiarities to which he had alluded in relation to the curvature of the roots, the large size of the pulp cavity, the vascularity of the pulp, and the rapid centripetal calcification of the latter in the *incisors* prevailed in a modified degree with the *molars*. Thus in the beaver, and those rodents which live on coarse vegetable substances, and wear away the grinding surfaces of the molars rapidly, there is a constant reproduction at their bases. Like the incisors, the root of the molar is a long, curved, undivided continuation of the crown. The principal advantage gained by this curve is that the shock incident to the occlusion of the teeth, as in gnawing with the front teeth, or in mastication with the back teeth, is distributed over a greater surface than it would be if the root of each tooth was perfectly straight, and in this way that delicate nervo-vascular structure, the pulp, is protected from injury.

Had the teeth been implanted vertically in the sockets as in man, the quadrumana, and many animals, the shock accompanying the comminution of the hard substances which the animal is compelled to gnaw and masticate, would, no doubt, have been transmitted to the pulps in such a manner as to destroy their vitality, and of course arrest further growth.

In the *molars* of those rodents which subsist upon softer food, and are therefore not subject to very great abrasion, no more dental substance is formed than is demanded to fix them firmly in their sockets.

The grinding surface of all the *molars* presents prominences and depressions, arranged with a degree of regularity which is quite interesting to observe. While there are differences in the genera, according with the diet, some having broader surfaces, with the prominences and depressions much more decidedly marked, than others; the markings are invariably in a transverse direction, from side to side, across the teeth. This is shown very finely in the *molars* of the beaver. The inequalities presented on the surface of these teeth are due, as in the case of the incisors, to the unequal loss sustained in the wear and tear of use by the different tissues that compose these organs; the enamel, dentine, and cementum of which they are composed, being arranged in a number of alternate vertical layers. The cementum, of course, wearing away more rapidly than the dentine, and the latter than the enamel, gives to the teeth a better triturating surface than would have been presented if the crown had been covered entirely by either of the above tissues, for under such circumstances the abrasion taking place would have resulted in the formation of a smooth and polished surface, which could be of little use in grinding coarse substances to a powder, or reducing them to a pultaceous mass. We have here presented in nature the principle of which the miller takes advantage, who converts the grist brought to his mill into flour by subjecting it to the trituration of upper and lower stones of large size, which are grooved on their opposing surfaces.



MICROSCOPICAL SECTION.

The diagram of a transverse section of the molar of a rabbit on the black board, taken from Goadby, presents a fair representation of the arrangement of the different tissues in the molars. The *enamel*, *a*, forms partly the outside of the tooth, but a portion of it runs through the tooth in a tortuous manner, dividing it into four portions, and inclosing in each a considerable quantity of *dentine*, *b*, with the *pulp cavities*, *c*, in the centre. The remaining space in the tooth between the folds of enamel is filled with *cementum, d.*

In conclusion, there was one peculiarity to which he desired to direct special attention, in the skull of the beaver and the rodents generally, viz.: the absence of a glenoid cavity, or at least, anything like those presented in the skulls of carnivorous and herbivorous animals, and in man.

The lion, tiger, polar bear, and other purely carnivorous animals, for instance, have deep and narrow glenoid cavities in the temporal bones which receive the condyloid processes of the inferior maxilla in such a manner as not to admit of any horizontal motion, either backward or forward, or from side to side. The articulation between the bones constituting a pure ginglymous or hinge-like joint, the jaw is capable only of upward and downward movements. This arrangement and the shape of the teeth is in harmony with the habits and food of these animals, which are usually compelled not only to seize, but hold on to their prey; under such circumstances, any other kind of joint would prove not merely unreliable, but actually worthless.

The glenoid cavities in the temporal bones of the herbivorous animals, on the other hand, are quite shallow, and the condyloid processes of the lower jaw rounded. The joint thus formed not only admits of upward and downward movements, but also of extensive sliding motions in every direction; this, in connection with the complex teeth with which they are provided, enables them to thoroughly triturate the coarse articles of food on which they subsist.

In man, the glenoid cavities of the temporal bones are well marked, and usually quite deep and wide. The articulation of the transverse condyles of the lower jaw with them is intermediate between those of the herbivorous and carnivorous animals. For, although not possessing the great latitude of motion enjoyed by the latter, man is not restricted, like the former, to merely upward and downward movements, but has, in addition, a fair share of horizontal motion, backward and forward, and from side to side.

On examining the crania of the Rodentia, particularly the beaver, the space occupied by the glenoid cavities already referred to is found to present an entirely different arrangement from them. In the skull of the beaver for instance, there are large excavations or fossæ, for the reception of the condyloid processes of the lower jaw, but no bony cavities. The fossæ is bounded in front by the zygomatic process, and behind by a bony projection, about three-quarters of an inch in length, which is hollow, and connected with the auditory apparatus of the animal. There is no osseous structure extending from one to the other of these processes for the head of the condyles to rest upon; but it is reasonable to infer that in the fresh head a ligamentous structure passes from one to the other, and subserves the same purpose. And in this there is an apparent design. For had the condyles rested upon bone, even with an interarticular cartilage between them, as in man and the animals referred to, it is possible that with the incessant habit of the animal in gnawing hard substances, there would have been a much greater wear and tear of the tissues composing the joint than in the arrangement inferred to exist. While the upward and downward movements are quite free, the only horizontal motion that the jaw possesess is backward and forward; this is quite extensive in each direction, however, as the rapid attrition of the grinding surface of the molars and of the inner surface of the upper and lower incisors prove.

He did not wish to be understood as asserting that the peculiar characteristic presented in the articulation of the lower jaw in the rodents had not been observed by others and placed on record. It may be referred to in works that had not come under his notice, but there is not the slightest allusion to it in Cuvier,* Owen,† Rousseau,‡ and Roget.§

Dr. Flagg said that when it was first suggested to discuss the subject under consideration, it had occurred to him that the discussion might be rendered very interesting to those who would prepare themselves for speaking, even if it were not so much so to those who listened, for it would open a field which possessed novelty, doubtless, to most of the members, and observation and reading would constantly disclose new facts, which must give continual zest to investigators who had made the close study of the development, peculiarities, and diseases of the human teeth, their life's work. In this view he had suggested that each one should select some animal to speak upon, and thereby, in the aggregate, elicit much more information than if all should traverse at random a wider scope. He had not, however, thought of gentlemen selecting "types" of peculiar orders of animals, and had more recently adopted, with increased pleasure, that purpose, at the instance of Dr. McQuillen. He proposed, therefore, offering some remarks upon that order of herbivorous animals known as "Pachydermata." He had chosen as the "type" the Horse, not merely because his own practical acquaintance with that creature had given it peculiar interest to himself, but because the knowledge gained in that manner, and by the perusal of such authors as Rousseau, Youatt, etc., seemed to him possessed of a remarkable degree of general practical utility.

He desired, in proceeding to the subject of his remarks, to refer hastily to one or two points which had been overlooked in the interesting and lucid introductory of the evening, and which possibly had been deemed of scarcely sufficient importance to entitle them to notice, but not feeling certain that this was so, he would state briefly the manner in which comparative anatomists arrived at the order of which he had chosen a type.

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* Cuvier's Régne Animal.

† Owen on the Skeleton and Teeth.

‡ Rosseau's Anatomie Comparée du Système Dentaire.

§ Roget's Animal and Vegetable Physiology, one of the Bridgewater Treatises.

It had been stated that to the *Vertebrata* were accorded teeth, or substitutes for those organs; but as the first of a regular series of gradations, it was observed that while some of the vertebrata did not suckle their young, others did so. To these latter the term *Mammalia* has been given. This class is again subdivided into those whose extremities are furnished with fingers or toes, and others who are in this respect *hoofed.* These are designated as *Ungulata.* Among hoofed animals we have those possessing divided or cloven hoofs, and those possessing but a single or perfect hoof conformation. These are called *Solipeda.* Again, we find herbivorous animals that, after having filled a large paunch with aliment crudely masticated, have the ability to eject it again into the buccal cavity, and deliberately and properly prepare it for digestion; while, on the other hand, we have another order with no such power, but in which mastication, deglutition, and digestion follow in regular rotation. These are styled, he thought somewhat singularly, *Pachydermata.* Of this order, then, the horse was the type. He would here mention incidentally, that the head which he had taken from the college collection for the purpose of demonstration during his remarks, was the skull of a mare, and a very venerable one it was, too! He would also mention at this period that the inter-enamel formation which had been referred to early during the evening pertained, with some peculiarities, to the type he was considering.

He desired to premise more particular considerations in relation to the teeth of the horse, by a few words relative to the bones forming the seat of their germination and development, and would say that it would doubtless sound very strangely to those conversant only with human dental anatomy, when he stated that the teeth of that animal which corresponded to the upper teeth of man, were found in the superior and *inferior* maxillæ, and those corresponding to the lower teeth of man were found in what was designated the posterior maxilla; but if it was remembered that the presentation of the horse's mouth was downward instead of forward, and known that premaxillary bones existed, the arrangement would seem perfectly clear to all.

It was stated, upon the authority of Rousseau, that the germs of dentition were observable in the fœtal colt of about two or three months, continuing their development relatively with other structures, until the first teeth of the deciduous set generally appeared above the gums simultaneously with the time of birth. These are eight in number, and we find, therefore, the *first* and *second grinders* of either side, above and below, in the mouth of the colt at birth. According to Youatt, whose work upon this animal is full of interest, the progress of deciduous and second dentition was approximately as follows: At about the age of one week the central "nippers" appear; and he here called attention to the manner in which the horse seizes, wrenches, and nips off his food, as justifying this peculiarly farrierish term for what are usually called incisors by scientific men. At the age of one month the third deciduous molars are cut, and at the sixth week the lateral nippers, after which things remain stationary, so far as numbers, until about the seventh or ninth month of colt life, when the "corner" nippers appear, completing the twenty-four deciduous teeth.

He would here call particular attention to the fact that the age of the animal by *years* was best arrived at by the eruption of the permanent teeth up to a certain period, and after that, by the gradual wearing away of the same: thus, at *one* year old the first permanent molar (the fourth in order) would *erupt;* at *two* years the second permanent molar (or fifth in order) would appear; at *three* years the third permanent molar (the sixth in order) erupts, as well as the central permanent nippers; at *four* years old the lateral nippers erupt, the *central nippers* are *fully developed,* and the "tushes" will begin to appear. In regard to the tushes, he would state that they seemed almost exclusively to pertain to the horse, for it was seldom that they were met with in the mouths of mares; and he would also state, as the result of inquiry, that a most singular fact (if fact it be) is, that mares which possess these teeth early in life do not bear colts. At *five* years old the tushes are developed—the lateral nippers also—and the permanent corner nippers appearing, the colt is pronounced a horse. He would here mention that during the period extending from two to five years of age, the three deciduous molars have each been replaced by permanent organs in the order in which they erupted at first. This process of replacement is of course subject to the same laws as is the replacement in the human species, about which so much discussion has taken place before this Association; but the veterinary adopts the old theory of "absorption" by pressure, and thus severs the Gordian knot! He next referred to the general regularity with which the deciduous molars were pushed out by the eruption of their permanent successors, but in stating this would not be understood as intimating that this was invariably the case. Occasionally a very troublesome affair presented itself in the horse's mouth, which, by cutting the inner portion of the cheek, caused great annoyance to the animal, and sometimes quite extensive ulceration. This was commonly thought to be, and called, a second "tush," or "wolf's tooth," and extraction was the remedy for the evil; but an examination of one of these, either before or after extraction, was sufficient to pronounce it nothing more than the remains of a deciduous molar, in which only partial absorption had taken place, and presenting an appearance entirely analogous to a similar condition found frequently in the human mouth by almost every practitioner of dentistry. While upon the subject of the molars he would speak of the enamel, dentinal and cemental peculiarity of these teeth, in contradistinction to that of the nippers and tushes, saying that it had some resemblance to the relative formation and position of those structures in the teeth of the "Rodentia" referred to by Dr. McQuillen; but that instead of sections presenting the "alternate layer" peculiarity, they rather offered convolutions or intertwinings of the three different tissues. This was due to the fact that each molar had its origin in several distinct sacs, of which the superior teeth had five and the posterior four each; every one of these sacs appeared to develop, to a certain extent, a perfect tooth, but, after this development, a sort of cementation took place which produced the result found upon examination. The same excellent arrangement for milling or grinding the food was thus secured to the horse, that we had been shown pertained to some other animals. The enamel formation, as presented in the nippers, he desired to notice particularly, as by its folding over the edge and sinking into the tooth substance upon the palatine and lingual surfaces of these organs, it not only offered a greater amount of dense tissue to resist the wear incident to the prehension of the vast amount of food required by the animal, but was productive of an indentation or concavity, by the wearing out of which we were enabled to judge approximately of the animal's age after the development of all the teeth had taken place. Thus the central nippers, which erupted when the colt was about three years old, would be found to have their concavity or "mark" (as it is termed) obliterated at about *six years* of age. Irregularities and discolorations still exist, but the peculiar enamel prominence and formative indentation (which, to be able to recognize, requires examination of the mouths of old colts or young horses) will be found to have disappeared. The same condition of things will be found to exist in the lateral nippers at the *seventh year*, and in the corner nippers at the *eighth year;* but the examination thus far should be confined to the nippers of the posterior maxilla, for the conformation of the teeth of this jaw is such as to insure a much more rapid wearing out of the indentation than in those of the anterior jaw. After the eighth year we may judge, according to the observation of Mr. Youatt, that at the *ninth year* we shall find the anterior or upper centrals devoid of "mark," at *ten* the upper laterals, and at *eleven* the upper corner nippers in the same condition. Peculiarities of the teeth have been offered as, in a degree, determining the age of horses, until they are even so advanced as twenty or more years, but they were considered as possessed of insufficient interest to be pointed out at this meeting, so much time of which had already been consumed by him. He would say, in conclusion, that little or no progress had been made in the investigation or treatment of dental diseases pertaining to horses—practically, the file for roughness of the teeth, and extracting instruments for the removal of them, was the extent of remedial agencies, but it is recognized by veterinary surgeons that various and dangerous affections, both of soft tissues and osseous structure, arise rom diseases of the teeth, and ophthalmic, exanthematous, and enteric difficulties occur as concomitants of dentition, and are relieved by combining a proper lancing of the gums, together with constitutional treatment.

Dr. Fitch said, he had supposed that the discussion would call out information relative to the diseases of the teeth of animals, as well as to their peculiar habits, and suggest ideas in respect to the causes of such diseases, and their constitutional treatment. Also facts concerning alimentation; the effects of different kinds of food upon the teeth; and the nature of the substances that enter into the structure of the teeth; but the discussion had taken a course somewhat different from what he had expected. As far as related to this subject, he had devoted his time to the consideration of the carnivorous animals, which exhibit certain peculiarities in their dental organization. The Carnivora may be represented by the following animals: the dog, the civet, the hyena, the tiger, the stoat, the bear, and the seal. What he had to say in the few remarks he had to offer, would have reference to the first family of this class—the dog. Their teeth are well adapted to their modes of life—to seize and slay their prey, and also to tear it in pieces; enabling them to comminute the harder substances of animal and vegetable food. The maxillary bones and the temporo-maxillary articulation are peculiar in conformation. The fossa of the glenoid cavity is deep, and the articulation is ginglymus or hinge-like. The temporal and masseter muscles are large and powerful. The motion of the jaw is up and down. These peculiarities enable the dog to hold his prey securely. He remembered an instance which occurred a few years since, in the City of New York, where a bull-dog seized an infuriated bullock by the nose while passing up Broadway. The animal thrashed the lamp-posts, etc. with the dog while passing two or three blocks, and was at last thrown by reason of the weight of the dog suspended from his nasal organ, when it was found that the dog was quite dead, having his jaws firmly locked upon his prey. The formation of the articulation saved the dog, undoubtedly, a dislocation of jaw.

The greyhound and terrier, on the contrary, do not hold their prey, but lacerate and kill by one or a succession of rapid bites. A rat terrier has been known to kill sixty rats in as many seconds, the rats being confined in a room.

The dog has twelve incisor teeth, six in the superior, and the same number in the inferior jaw; four canines or cuspids; sixteen premolars or bicuspids; and four molars in the superior, and six in the inferior maxilla; making in all forty-two permanent teeth. The deciduous teeth are twenty-eight in number.

The incisors of the permanent set increase in size from the mesial line. They form a segment of a circle, larger in the superior arch. The canines or cuspids are curved, quite large and strong, with pointed crowns, constituting formidable weapons for tearing and cutting flesh.

The premolars have large sub-compressed conical crowns, increasing in size to the third in the upper and to the last in the lower jaw. They acquire one or more posterior tubercles as they advance in growth. The fourth superior premolar is much larger than the others. The first superior molar has three cusps; one very broad, being internal. The inferior premolars and molars are so formed as to antagonize the superior corresponding teeth—tubercle to groove, and groove to tubercle. This arrangement furnishes an apparatus highly adapted for cutting and breaking their mixed food. The incisors, canines, and first premolars are single-rooted teeth. The second and third superior premolars, all the inferior premolars, and the first and second inferior molars have two roots; the fourth superior premolar and second molar have three roots; the first superior molar has four roots or fangs.

The premolars of the dog's deciduous teeth are rarely calcified; they generally disappear in the pulpy or cartilaginous stage. The incisors of these teeth present at about the third week from birth; the last deciduous molar appears as early as at the end of the sixth week. The temporary teeth of the dog are much smaller than the succeeding set.

The first permanent premolar appears previous to the shedding of any of the deciduous teeth; the deciduous germ of this tooth disappears before birth.

The peculiar microscopic structure of the teeth of the dog is not unlike the structure of human teeth, with the exception that they have a finer and denser structure, the tubuli being much smaller and more tortuous. The dentinal cells are sub-hexagonal, about $\frac{1}{5000}$th of an inch in diameter, the peripheral contour forming nearly a curve. The dentine is non-vascular. The tubuli are more curved, and have more dichotomous divisions and more numerous lateral branches than human teeth.

Dr. Flagg inquired whether the Carnivora were subject to diseases of the teeth.

Dr. Fitch replied that the teeth of the subjects which he had examined bore no evidences of disease.

Dr. Barker said he regretted, and especially in view of what had been said during the evening, that he had not selected some other type than the one he proposed to consider, as he had been necessarily precluded from personal investigation of the subject of his remarks, and compelled to rely mainly on the statements of others. He presented to notice a molar tooth of a mastodon; and the specimen which he held in his hand he thought was the finest they had probably ever seen.

The mastodon, he said, as they were well aware, was an extinct animal, there being but two species of that type (Proboscidians) left; namely, the African and Indian elephant.

The molar teeth of mastodon differ materially from those of the elephant. In the former the grinding surface of the molars are divided into wedge-shaped, transverse ridges, and the summits of these are subdivided into smaller cones, more or less resembling the teats of a cow; hence Cuvier gave them their generic name, calling them mastodon, from two Greek words, signifying a nipple and a tooth. Another modification distinguishing the molar teeth of the extinct genus is in their structure. Thus the dentine, the principal substance of the crown, is covered by dense and brittle enamel, and a thin coating of cementum is continued from the fangs upon the crown of the tooth; but this substance does not fill up the interspaces of the divisions of the crown, as in the elephant.

The molar teeth of the elephant are remarkable for their great size and complexity of structure. But very little more than the grinding surface appears above the gum, the crown being to a great extent buried in the socket. The grinding surface is deeply divided into a number of transverse perpendicular plates, consisting each of a body of dentine coated by a layer of enamel, and this by a dense substance, appropriately termed cement, since it binds together the several divisions of the crown.

As they perceived by the mastodon tooth presented, the enamel was exceedingly dense, and though the specimen was found among the tertiary deposits in Arkansas, this structure was in a fair state of preservation. The dentine, however, was so frail that it was necessary to varnish it to preserve it from crumbling. There was one peculiarity present in the tooth which he had noticed, and that was the presence of osteo-dentine in the pulp cavities, referred to by Dr. McQuillen in his introductory remarks. He would not, however, positively say that it was that substance, but judged so, from the fact of its state of preservation being nearly equal to the enamel, while the dentine immediately adjoining it was frail and friable.

The mastodon, like the elephant, had two tusks projecting from the intermaxillary bones, but it had also two tusks present in the lower jaw that were not found in the elephant. According to Professor Owen, the deciduous teeth of the mastodon consisted of two incisors and six molars in each jaw, making sixteen in all; the permanent set of two incisors and seven molars in each jaw, making thirty-two in all.

Dr. Barker read from Professor Owen's work the following description of the tooth presented:—

> "The last molar of the upper jaw, the seventh in the order of development, has five pair of cusps, the anterior talon of the antecedent teeth being here developed into a normal pair, which is also the largest; the posterior talon sometimes consists of a group of tubercles, the posterior of which represents an accessory talon; sometimes the anterior tubercles of the talon are so developed as to resemble a sixth pair of cusps; at other times the talon presents only two or three tubercles in the same transverse row, and is thus subject to great variety, as is also the entire tooth, in respect of size. The tooth is supported by two principal roots, of which the anterior and smaller supports the two anterior pair of cusps,

the posterior mass the rest of the tooth; this broad fang becomes subdivided into two or more in the progress of age. Not any of the preceding molars have remained long enough in their sockets to exhibit the effects of such extensive abrasion as has been observed in specimens of the last molar; this, therefore, becomes itself a character of the tooth which is longest retained, when the distinguishing tubercles have thereby been destroyed."

Dr. McQuillen remarked that the primary division of the Vertebrates was into four *classes*, viz , fishes, reptiles, birds, and mammalias; these again, owing to the varieties of each, were subdivided into numerous *orders*—the classification of the different members of an *order* under one head being due to some striking peculiarity which belonged to each member of that *order*, but not presented in any other. Thus the rodents, as already stated, have chisel-shaped incisors, with which they gnaw hard substances, and hence their name. In making the diet a means of classification as in the carnivorous and herbivorous animals, the comparative anatomist takes advantage of certain marked characteristics in the digestive apparatus to subdivide these animals. Thus, while the horse and the cow are both herbivorous animals, they differ very much in this respect, the horse having front teeth implanted in the premaxillary bones, and one stomach, the cow having *no* front teeth in the premaxillary bones, but possessing four stomachs. The food of the latter animal, after passing into the first stomach and remaining a short time, is returned to the mouth and rechewed before it is fit to pass on to the other stomachs. Owing to this fact, all the animals possessing this peculiarity are called Ruminants. In conclusion, there are remarkable differences, not only in the teeth, but in the extremities of the carnivorous and herbivorous animals. Thus, associated with the pointed teeth of the former, sharp claws are invariably connected with their extremities, while in the latter, along with broad and flat, though considerably roughened, grinding surfaces presented in the teeth, the extremities terminate in hoofs, which may be either single, as in the horse, or cleft, as in the cow.

On motion of Dr. Peirce, the subject was continued for consideration at next meeting.

EDITORIAL.

ARSENIC.

It will be seen by my former article on the above subject, that it is impossible to get at the precise amount of arsenic necessary to destroy sensitive dentine, or the length of time it requires, as both these points depend upon the impressibility of the parts, or, perhaps, better say the resistance of the tissue to a destroying agent. If six hours be sufficient, it is not good or judicious practice to let it remain forty-eight hours; but if it requires ten days, it can be persevered in, omitting a day or two to see what the result may be by time, as it is true that the surface of the decay may contain enough, when by time carried down to the sound surface, to render it insensible to the removal of the decay. I always make it a point to place the arsenic around the margins of the cavities, where they are large—I mean the orifices—as there is less liability to its being absorbed to the injury of the pulp. Sometimes I apply the powder alone, and cover it with cotton, or rub the powder into a piece of thread or loose cotton, according to circumstances. It sometimes happens that a tooth may be tender when the cotton is removed, but after the cavity is exposed for awhile it becomes less tender even in a few minutes. I plugged three inferior bicuspids on the seventeenth January, into which I had placed the arsenic two weeks previous, the patient having removed it the next day. They were shallow, but rather wide cavities, and the dentine apparently hard. It is important to cut away as much of the bone as can be to prevent the arsenic in it from being absorbed after the plug is introduced.

I do not see how it is possible for rules to be laid down by which any one can be guided in the use of remedies to destroy nerves or sensitive dentine. When one has learned all about the nature of the substance used, and the difference which is observed between individual temperaments, he must learn the rest by patient observation, and not allow himself to be persuaded that the difference which occurs between authors will militate against his success, as no writer can do more than give an approximation to his experience by his pen; at least, so it seems to me. But the hints thrown out cannot fail to be of some use to a learner in a new direction. Sometimes the dentine becomes discolored a reddish hue, by using arsenic, especially when sufficient is applied to permeate to the pulp. This will seldom disappear unless the pulp be destroyed and the tooth left open to the air and saliva for some time; but even under these circumstances a tooth does not always recover, but runs into a bluish color. This same thing happens also when the arsenical paste is applied to destroy a pulp, especially if it be placed in the canal of the root, or too much has been used. Some writers attribute this to inflammation, disintegration of blood-globules, or infiltration, or absorption of *hæmatin.* This view I am not ready to adopt, as the reddish hue is observed under various circumstances, such as in the teeth of persons who have died by hanging, drowning, and in cholera, etc. A singular case occurred to me a short time since, which I cannot explain. The principal portion of the pulp of an inferior left first molar tooth was destroyed by the usual paste, but there still being some tenderness in the posterior root, I placed in a small amount of the paste, which was removed in twenty-four hours; in a few days the patient returned and wished the tooth extracted, as it was very painful. I desired the patient to delay a few days, keeping cold water applied to the parts as much as possible; but the next day the patient returned, saying that the tooth must be extracted. There was no sign of inflammation about the parts, no soreness of the tooth to the light stroke of an instrument; the nerve had been removed far down the root, and I was reluctant to extract the tooth, but I did so, partly to relieve the patient and partly to investigate the case. I washed the tooth well with water, found the pulp had been removed at least two-thirds of the depth of the root; there was no inflammation of the periosteum. Of course, I could not account fully for the pain under which the patient had been suffering.

The patient was a young lady of about twenty years of age, and of a highly-organized and impressible temperament. The pain subsided in a short time. I placed the tooth on the inside of the sill of the window of the office, and on looking at it a few days after, to show it to some one present, I discovered to my surprise that the posterior root of the tooth opposite where the last portion of the paste had been applied had become quite red, near the neck. This was not so when the tooth was extracted; it became so afterward; and I am quite sure there was no blood, either on the inside or the outside of the root, to be absorbed. It was the first case I had ever discovered as taking place out of the mouth. It sometimes happens that when arsenical paste is applied to destroy a pulp, that it does not seem to act sufficiently to destroy the vitality of the part to which it is applied; in such cases I drill the tooth so as to get to the nerve at a new point, and in that way succeed fully to effect the desired purpose. This is a valuable hint in some cases. I have not made these remarks as a method of treating the *dental pulp*, but as hints on the use of *arsenic*.

J. D. W.

HUMAN AND COMPARATIVE ANATOMY.

DURING the past few months, a number of professional friends, residing in different parts of the country and in Europe, have sent us several valuable specimens for the Museum of the Pennsylvania College of Dental Surgery, in illustration of human and comparative anatomy. The institution, in this way, has been placed under obligations to Dr. P. Calais, of Hamburg, Germany, for two atlases containing a large number of admirable photographs (life size) of dissections of the brain, trigemini, portia dura, pneumogastric nerves, etc. The truthfulness of these photographs to nature proves most conclusively that photography may be made very useful in illustration of lectures, if the expense attendant upon reduplication precludes its employment in illustration of works.

Dr. Henry Stellwagen, of Philadelphia, has also contributed a large dolphin; Dr. Nones, of Wilmington, Del., in addition to a number of specimens presented previously, the jaws of a shark; and Mr. Wetherill, of Burlington, N. J., the skeleton of a bat, mounted in a very handsome manner. In acknowledging the courtesy of these gentlemen, we would take occasion to say that if other members of the profession should feel disposed to favor the institution in the same way, the Museum of the school, which is already quite valuable, would soon bear a favorable comparison with the most extensive in the country, on the comparative anatomy of the teeth.

Every one has it in his power in this way to aid the cause of dental science, and at a very slight expense. There are very few, if any, who have not in their possession specimens which they regard as novelties, and as such, occasionally exhibit them to patients whose curiosity is likely to be gratified thereby. As isolated specimens, they, of course, can only be of limited service to the possessor and friends, but placed in a collection along with other specimens, thereby serving as connecting links in the great chain of organized structures, and employed as a means of illustrating systematic courses of lectures delivered before large bodies of students, their value is increased a hundredfold.

As the poet truly says—

> "———Each moss,
> Each shell, each crawling insect holds a rank,
> Important in the plan of Him who framed
> This scale of beings—holds a rank which, lost,
> Would break the chain, and leave behind a gap
> Which nature's self would rue."

To the dental student and practitioner what study can be more interesting, instructive, and inexhaustible than that which aims to establish the connection existing between the different links of this great chain! And what profession, by a prudent husbandry of time, affords greater facilities for the prosecution of such studies than the dental profession!

J. H. M'Q.

HABITS OF THE BEAVER.

The accompanying letter, for the privilege of publishing which we are indebted to the courtesy of Mr. Jenkins to whom it was addressed, is from a gentleman who, we are informed, takes a great deal of pleasure, and spends a considerable part of his time, in hunting the beaver, elk, moose, deer, and other wild animals found in our northern forests; and who, on a number of occasions, has accompanied expeditions in those regions whose primary object was for scientific investigation. As an actual observer his letter is, therefore, the more interesting and reliable, and in connection with the remarks in the Pennsylvania Association, on the Rodentia, it is trusted that a fair idea may be obtained of the peculiarities of the Beaver. J. H. M'Q.

Dear Sir.:—I will, so far as space permits, comply with your request to give you some account of the habits of the beaver.

The first work of a family of beaver is to build a dam, which is almost invariably done by cutting down alders or other small bushes, piling them in a rick across the stream, and heaping on mud and stones, then more alders, then more mud and stones until it attains the desired height. The dam is repaired every fall, so that in time it becomes much higher than it was when first built. I have known them six feet high. They usually build three or four other dams below the first, to hold the water in case the first should be injured. The object of a dam is to prevent their being flowed out in freshets, or left dry in droughts, and to afford them an easy way of conveying the wood which constitutes their food to their houses. This wood is usually white or yellow birch, poplar, and willow.

When cutting down a tree they begin on the side opposite to the place where they wish it to fall, and cut mostly on that side. They begin to cut low down on the spurs of the tree, gradually sloping the stump upward, and rounding it from the centre to the sides. In cutting a small tree they take out quite large chips, which look as if they were cut with a series of gouges, but in large trees the wood is usually gnawed quite fine. The chips are slanted at each end like those cut by an axe. The trees are always cut so as to fall toward the water; and they fall them in the position which they desire as often as the best axeman. Indeed, I never remember to have seen one which fell wrong, although in the spring, when the snow was deep, I have seen them felled parallel with the stream so that they could be easily rolled in. The trees which they cut are from two to fifteen or sixteen inches in diameter. I think that they sometimes cut down trees which are two feet thick. After a tree is down they cut it into lengths varying according to its size. They then drag the long pieces and roll the short, thick ones to the water, and float them to their house. When a tree is some distance from the water, a canal is dug as near to it as the nature of the land will permit, and it is then floated through the canal into the pond. These canals are sometimes from ten to twenty rods long.

After getting the wood to the house, they raft it on one or both sides of the house, keeping it under water by tucking the ends under roots, etc., and binding one stick to another. This wood is for their winter food, and in the winter they cut it into short lengths, like stove-wood, and carry it into the house, where they gnaw off the bark. The next spring the refuse floats on to the dam and is buried in the annual repairs. I omitted to mention that these dams are built in a narrow place, or where a rock or island divides the stream, as two short ones can be built easier and firmer than one long dam. They are also all provided with waste-ways for the escape of surplus water.

The houses resemble a great heap of meadow turf. I have seen them twenty feet in diameter at the base, and six or eight feet high; but this size is not common. They are built of poles, sticks, mud, etc. The beavers build their houses small at first, but then gnaw away on the inside and build on to the outside, thus making a larger cavity within than they otherwise could. I once saw three setting poles (which the river-drivers had left some years before) built into one house. These poles were twenty feet or more in length and two inches in thickness.

There are some beavers, called by the Indians, "bachelor beavers," which live alone, and do not build either houses or dams, but have holes in the banks where they deposit their wood. These are usually old males who have lost their mates, or have been expelled from communities. In families, the parents are usually destitute of whiskers, these being bitten off by the young. The families vary from two to ten, although from four to six or eight is the most common number. I have known of but eight instances where more than twelve beavers were found in one family. When the family increases, the young pair off and set up for themselves on some other stream. Beaver have two young at a birth. Many are destroyed when small, by otter.

You will notice that the few lines which I have written are widely at variance with such descriptions of beaver as may be found by reference to "Lear's Wonders of the World," "Harper's Life of Jim Beckwith," etc. These say that beaver build their dams by falling large trees, and sharpening stakes, and filling between with earth. This they never do. They also say that they build their houses with vaulted roofs, with windows looking out upon the landscape, etc. They have no openings in their houses except under water. They also say that beavers live in communities of from one hundred to two hundred and fifty individuals, and that they use their tails as trowels, to plaster their houses and dams. They never plaster either of them at all, and use the tail only in swimming. It was stated a few weeks ago in "The New York Ledger," that beavers met, in large lakes, in the summer, to marry, and to hold council. I have never been present at one of these meetings, but will report for the Ledger, when I am. There is a belief in the minds of many people, that beaver possess some power to draw the air from wood, so as to sink it. This arises from the fact that they confine the wood under some heavy body, and when liberated, it floats. I have taken great pains to investigate this subject, but have not found an instance where it was not thus confined.

There are a great many things about beaver which I do not know, but I have written these last lines to correct what I know to be errors.

Yours, M. HARDY.

OBITUARY.

IN the *Christian Repository* (Montpelier, Vermont,) of December 21st, 1861, we have announced the demise of George W. Shattuck, D.D.S. He died at his residence in Williston, Vermont, on the thirtieth of November last, aged twenty-six years.

While attending lectures at the Pennsylvania College of Dental Surgery, (from which he graduated,) session of 1860–61 and during the latter half of that session, he was attacked with hemorrhage of the lungs. The violence of the attack was such as to render it necessary for him to relinquish the active pursuit of his collegiate studies, and return to his home and family. Here began to manifest itself, in a more decided manner than it had before, the disease which, alas! so soon hastened his separation by death from the endearing relations of home and friends.

We would fain write, though not without the saddening thought and painful emotion in recording, our tribute in memory of the departed, and as well in a word of condolence to the bereaved ones in their mingled cup of bitterness and sorrow. C.

DENTIST TO THE GIRARD COLLEGE.

At a recent meeting of the Trustees of the Girard College, Dr. Jas. M. Harris was elected Dentist to this excellent institution. The trustees have reason to congratulate themselves upon securing the services of such an efficient practitioner—one who can and will take the time to do justice, so far as it is in the power of a single person, to the charge committed to his care. J. H. M'Q.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

Porcelain Impression Cups.—At a recent meeting of the College of Dentists of England, Mr. Rutherford directed attention to some porcelain trays which he offered as a substitute for the ordinary metallic cups employed in taking impressions of the mouth. They are described as very clean looking, and easily kept so. It has been suggested that they would be likely to break easily. This objection, however, does not hold good where persons are careful with the articles. As an illustration, we have had in constant use, for the last two years, a small article, (made of porcelain, much thinner, no doubt, than these trays,) called by chemists an evaporating dish, and yet it is as perfect as the day it was bought. In addition to the cleanly appearance, the moderate price at which the porcelain trays no doubt could be furnished would make them an object of consideration.

The Vulcanite—November.

"Refining, Alloying, and Working Gold.—As many members of our profession are located remote from dental depots, or from persons versed in working the precious metals, a practical knowledge of the most simple manner of refining scraps and filings may be of advantage, not only in a great saving in a pecuniary point of view, but in a uniformity in the quality of the gold, and consequently a better result will obtain. Much of the gold plate used by dentists in the United States is quite too inferior in quality for the health of the patient, as well as being less durable, much more liable to crack or split, both in swaging and by use in the mouth. Gold 20 carats fine possesses greater strength, is easier adapted, and will retain its shape better while soldering, and preserve its color longer than when a lower quality is employed; and it is cheaper when the dentist works his own plate from coin, costing less than ordinary plate at 90 cents per dwt. Take four American five-dollar gold pieces and one gold dollar, which will make a little over 21 dwts., add 2 dwts. pure copper and 1 dwt. pure silver, melt in a new crucible, the inside being previously well rubbed over with borax. Care should be taken not to carry the heat too high on new metals, as the difference in the specific gravity of the three metals is so great as to separate them under a too high degree of heat; when the metal boils or assumes a rotary or revolving motion in the crucible, it may be poured into the ingot moulds, previously heated to a sissing heat and oiled with olive oil. Gold is always tougher and of a finer texture for repeated hammering and annealing before being rolled into plate. All the tools employed in working gold should be highly polished, and entirely free from dirt, dust, or rust spots. Too great care, in this respect, cannot be exercised; the gold should be often annealed by carefully heating to a dark-red heat, and, while slightly hot, plunged into strong muriatic acid, then thoroughly washed with clean warm water, and the surface is to be well rubbed over with very fine sand, and wash again. This should be repeated each time the gold is annealed, the object being to free the surface from all impurities. Solder for this quality of gold may be made by taking 18 parts of the scraps or cuttings from the plate, four parts pure silver, and two parts fine brass wire or English solid-headed pins; melt the gold and silver first, and then add the brass wire or pins, and pour same as for gold.

"All gold or silver solders should be wrought out free from cracks, if possible, and with the same care as if it were intended for plate or springs; if solder cracks in working or is over-refractory, it will not make strong or pleasant-flowing solder; it had better be melted over. Solders may be made for any quality of gold by employing the above formula—using pieces of the plate to be soldered, and alloying as above. Small quantities, from one to five dwts., may be melted on a piece of charcoal with a common mouth blow-pipe; and while in a state of fusion, quickly press the molten mass with the flat face of a hammer—this chills the solder, rendering annealing necessary before any attempt is made at working it.

"Gold containing zinc, lead, tin, or copper may be refined by melting in a clean crucible; and when quite hot, (nearly a white heat,) throw into the crucible a little finely-pulverized saltpetre and borax, keeping the metal at a high heat, and repeating the application of the saltpetre and borax at intervals of ten or fifteen minutes for an hour or two; then pour into the ingot moulds, (heated and oiled;) then break up the ingot, and place it in a clean crucible well rubbed inside with borax, and when melted, add as much corrosive sublimate as will lie on a five-cent piece; continue the heat for thirty minutes, and pour as before directed. If the gold is still refractory, repeat the refining process till it will work; twice heating is generally sufficient; remember, the heat before pouring into the ingot mould should only be a bright red, and not a white heat. Filings should never be first melted with scrap gold; when filings are to be melted and refined, first pass a magnet many times through them to remove all the iron or steel, then place them in a glass or earthen dish, and cover them with strong nitric acid, for one hour or more; this will dispose of any silver or brass they may contain; pour off the acid; the silver in solution may be precipitated with common salt, (forming a chloride,) or the acid evaporated by gentle heat; the silver can then be melted in a crucible with a little sal ammoniac in fine powder. The filings are to be washed with water, and mixed with a solution of borax rubbed to the consistency of cream, and placed in a crucible the inside of which has been well coated with borax, and placed over a moderate fire at first, and, when melted, a little saltpetre added, and otherwise treated the same as when refining scraps; filings should be remelted if necessary, till the ingot is soft and tough, before adding scrap gold with it; they may then be melted together and worked into plate. The best silver plate for dental use is made from pure silver (not coin) and from five to eight per cent. of platinum, melted together; the texture of the plate is fine, and any degree of stiffness may be imparted to it by varying the quantity of platinum. Good silver solder may be made by adding to one ounce of pure silver fifty medium-sized English solid-headed pins, melting together at a bright red heat, and poured into the ingot moulds, and worked into plate about No. 26, common gauge; the solder should be annealed often at a low heat while working, and, before using, the surface rubbed with fine sand. No more solder should be cut into small pieces than is wanted at the time, as either gold or silver solder cut into small pieces presents double the surface to atmospheric action; and the freer from oxydation and the brighter and cleaner the surface of all solder is when used, the more perfect will it flow, and is correspondingly stronger and more compact, and the union of the parts firmer. Gold spring-stuff may be made by melting together fine gold 100 parts and platinum 10-16 or 18 parts, according to the amount of spring required; it should be carefully hammered and annealed often while working, so as to prevent any fine checks on any part of the surface; however small the checks, they weaken the spring, and it ultimately fails at these points."

British Journal of Dental Science.

At a recent meeting of the Odontological Society, a paper on the following subject was read by Mr. Tomes, and at its close a lengthy discussion of the subject ensued.

"On Certain Conditions presented by Amalgams used in Filling Faulty Teeth.—The unqualified condemnation of amalgams on the part of some, and the confidence reposed in mercurial fillings by other dental practitioners, is a sufficient indication that the question has not received that amount of investigation which its importance merits. We meet with cases in which teeth filled with amalgam have lasted for fifteen or twenty years, indeed, until with the advanced age of the patient the teeth have loosened and fallen out. But far more numerous are the cases in which the presence of the amalgam fillings have failed to arrest for any considerable time the destruction of the teeth. With opposing opinions and inconclusive results, it is incumbent on those who regard the use of amalgams with unqualified disapprobation to show the grounds upon which their condemnation rests; we should be told why amalgams fail to preserve the teeth into which they are introduced; and it should be clearly pointed out that the conditions necessarily involved in the use of these mercurial compounds are such as must secure an unfavorable result. On the other hand, those who advocate the use of amalgams should be able to point out why the unfortunate so far outnumber the successful cases. Why, in one case, an amalgam filling preserves a tooth for an indefinite time, while in another case the disease is arrested but for a few months. To say that these differences in the results depend upon accidental causes is but to admit that we are unacquainted with the conditions the presence or absence of which will determine in each case the success or failure of the treatment.

"In cases of failure it is not enough to condemn the material used in the treatment, unless it is at the same time shown that the employment of other materials would have led to a successful issue. Dental surgery has arrived at that point when mere opinion, unless supported by clearly stated evidence, cannot be accepted as a guide for practice. To analyze one by one all the conditions attendant upon the operation of plugging a tooth, and those to which the tooth is subsequently exposed, is by no means a simple or an easy task. The recognition of a difficulty is, however, in many cases, the first step toward its solution, and although we may be unable to acquire a perfect knowledge of our subject, yet we may, and no doubt shall, make great advances from the point at which we at present stand. The rate of progress will, I feel sure, be hastened by our devoting ourselves to the investigation of special points, which, after being worked out by individuals, should be brought before this society for free and ample discussion. With this feeling I undertook to prepare for the society a paper upon the physical conditions presented by the different materials used in filling teeth. I did so with the hope of throwing some further light upon the use of amalgams, but more especially with the hope of inducing others to take up, for the purpose of close investigation, this and other points of practice.

"To treat of amalgams satisfactorily, it would be necessary, in the first place, to consider the different amalgams as chemical compounds, both as respects the substances used in compounding each amalgam and the proportions of the several ingredients. I, in common, I believe, with many others, purchase and use materials prepared by Messrs. Ash or those of other makers, without knowing the proportion the incorporated metals bear to each other. Whether definite proportions exercise an important influence in these compounds, in which mercury plays so singularly an important part, I am unable to determine; but the fact that in certain alloys the proportion in which the ingredients are combined will determine whether a chemical combination, or a mere mixture, results, indicates that the question of proportions should be fully investigated.

"The consideration of proportions will involve the investigation of the nature of the process by which the hardening of the compound is effected. It is usual to state that this process is one of crystallization, but I am not aware that any one has shown that crystals are formed. Whether an amalgam in hardening either expands or contracts is also a question of great practical importance, and the character of surface retained by the mass when its induration is complete, cannot be neglected. It is to the investigation of these latter points that I have directed my attention. The experiments instituted have been confined to the amalgams in general use, with the view of ascertaining the merits of well-known compounds, and of making them the basis of comparison in the examination of combinations, which may at a future time come under our notice. But even here, at the very threshold of a very simple inquiry, we are, most of us, met by the difficulty of ignorance. We are, for the most part, dependent for our supplies upon those who prepare amalgams for sale, and who, in the interests of their trade, do not proclaim the formulas they follow. We are, in fact, daily using amalgams, concerning the ingredients of which we have no precise knowledge. To each of these imperfectly known compounds we attach the name of their respective makers—a custom which in itself shows pretty clearly that we are not proceeding upon very scientific principles—that we trust to the knowledge of the compounder, who is unacquainted with the results of practice, rather than to our own knowledge, both for the determination of the ingredients used, and of the relative quantities of the component parts. In conducting the experiments, the results of which I am about to lay before the society, the following plan has been adopted. Slips of ivory have been prepared, the size of each being similar, excepting in a diminished, width to the ordinary glass slide used for mounting microscopic preparations. Each ivory slide is perforated through its centre by a perfectly cylindrical hole.

When about to be used, the slide is firmly clamped down upon the flattened surface of a block of ivory, by the assistance of which the cylindrical perforation is converted into a cylindrical cavity—having a perfectly flat floor lying at right angles to the walls. On the under surface of the slide several minute angular fissures have been cut into the edge of the wall of the cavity by a very small four-angled file. This expedient has been adopted for the purpose of testing the readiness with which the amalgams used enter minute fissures.

"The amalgam has been introduced with ordinary care, and forced into the experimental slide with a round-headed burnisher sufficiently small to enter with readiness the cavity.

"When the amalgam has perfectly hardened, the clamp is relaxed, and the slide withdrawn from its position on the block of ivory, thereby exposing for examination that portion of the plug which rested upon the floor of the cavity, together with the fissures in the walls produced by the file.

"The amalgams in general use may for convenience be arranged into two groups. Those which are combined with mercury as a preliminary proceeding, the mass being softened by moderate heat, and the excess of mercury squeezed out prior to the introduction of the plastic mass into the tooth; and those which are completed by the addition of the mercury to metallic filings at the time of use. Of the former kind, I am aware of two varieties only. The one formed by the solution of pure copper in mercury; the other, Sullivan's cement, compounded, it is said, of copper mainly. Each of these have been subjected to the experimental test already described, and with the following results. In test slides Nos. 1 and 2, the amalgam when it has hardened in contact with the ivory forming the bottom of the cavity presents a fine granular surface. It has failed to penetrate into fissures extending from the sides of the cavity in the one slide, and in the other it has separated from the wall of the cavity. In neither slide is the cavity fully and entirely filled. The microscope shows that the plug is in neither case perfect. In slide No. 3, the pure copper and mercury was introduced. The process of hardening has not in this case been attended either with the same amount of contraction, or of change of surface, as in the preceding specimens, in which Sullivan's cement was used. Indeed, this specimen exceeds any other I have examined both in respect to the smoothness of surface it preserves, and to the closeness with which, after hardening, it is applied to the surface of the cavity in the ivory slide. In slides Nos. 5 and 6, an American amalgam, sold by Messrs. Jameson, of Glasgow, was employed. This compound has hardened in contact with the ivory, with a very rough, granular surface, and the mass has obviously contracted, so that had the surface been such as when closely applied to the walls of the cavity would have served to exclude the ingress of moisture, the general contraction would have rendered that property useless. In each case the fillings were carefully rubbed with the mercury in a mortar, and the mass when perfectly incorporated was previous to introduction washed with ammonia.

"In preparing slide No. 8, the fillings sold by Messrs. Ash were incorporated with mercury in a mortar, the mass washed in ammonia, and then, after the expression of the superfluous mercury, introduced into the test slide. The result is a plug presenting a fine granular surface where hardened in contact with the ivory, and a considerable amount of separation from the walls of the cavity, the obvious result of contraction.

(To be continued.)

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

On the Dentition as a Natural History Character, and as an Evidence of the Existence of a Type; certain but unknown. By ROBERT KNOX, M.D., F.R.S. EDIN. "*The Dentition of the Vertebrata.*—The hard parts, termed teeth, besides forming valuable characteristics in zoology, assist, by their durability, in detecting the signification of the fossil world. They furnish, moreover, a valuable illustration of the doctrine of Type; and, with this double view, I have introduced into this section an inquiry into the dentition of a single natural family to which I happen to have paid much attention—the Salmonidæ. The inquiry, moreover, is based on a class of animals whose structure, more than that of any other, has contributed to the advancement of philosophic anatomy. The principles resulting from this inquiry, if rightly conducted, must be universally applicable; if not, they cannot be true: there must be something wrong in the generalization, or some error in the details leading to the generalization. But neither circumstance affects the laws of unity and of type, which apply to all or none.

"But in this chapter I aim at something more than a mere sketch of the philosophy of the teeth in a particular class of the vertebrata, although the importance of these organs in natural history warrants a careful and minute inquiry into their history in every natural family. In the course of the chapter I shall endeavor to show, from observations made on the same natural family, applicable, no doubt, to all, that in the history of the embryo and the young of a so-called genus we have the history of all the species composing it.

"*The Dentition of the Salmonidæ.*—The teeth of even the highest organized vertebrata were classed most happily by the illustrious De Blainville with the hair and other structures he so aptly and appropriately termed phaneric. They approach, as it were, the surface, have relations, more or less intimate, with the food and digestive organs, they are to a certain extent readily exposed to view, and are independent of all dissection. Hence they form characters of which the naturalist, properly so called, conveniently avails himself as an important feature in his zoological determinations.

"Eustachius, the anatomist, was the first who showed that the teeth do not grow from the root upward, as was conjectured before his day, but from the corona downward. Mr. John Hunter followed, at a long interval, and, as was his wont, left little to be gleaned in the field of inquiry for future observers. Lewenhoeck, before Hunter's time, calling in the aid of the microscope, threw out hints respecting the internal structure of teeth, which, in the hands of Retzius, assisted by a more powerful lens, amounted nearly to a new view or theory. The latter proved Cuvier's views to be too exclusive, and De Blainville's beautiful generalizations scarcely applicable to the extent he perhaps imagined. In short, the observations of Retzius proved that the dense materials composing teeth, some of them at least, bear a closer resemblance to bone than was at first imagined. The history of the growth of the teeth in serpents and fishes, carefully considered, might have long before led to this conclusion, and a vertical section of the first dorsal vertebra of the aged camel displays a density of bone closely resembling the so-called ivory of teeth. Thus a comprehensive view ought to have led anatomists, prior to the time of Retzius, to have been suspicious of the exclusive theory of the immortal Cuvier and the illustrious De Blainville.

"Speaking of the structure of the teeth typically—that is, abstractedly—they may be considered as composed of four substances. In limiting the number to four, I do not mean that this must be the number. There may be more or fewer; for of the four, two may be merely modifications of the same substance, and very possibly are so; and in respect of a greater number being the type, this can only become a fact, or the discovery of teeth still more complex than those already known. What I mean is, that in so far as my own observations go, I have observed four distinct substances composing teeth in the highest complexity—namely, 1st, a crusta pretrosa or cement; 2d, the enamel; 3d, the ivory or dentine; 4th, the substance I may call osseous, though not strictly bone, the last formed, the deepest.

"Nature, mistress of her own views and circumstances, moving in a type whose bounds are known only to herself, employs these materials as suits her purposes. Some animals she has provided with teeth possessing all the four substances; others have only two or three, or it may be one of the four; the others, if they were ever present, have disappeared, or left vestiges scarcely appreciable, like the collar-bones and hyoid apparatus in mammals. My esteemed friend, the illustrious Geoffroy, who objected to the theory of type, (at least he did so when I first saw him in 1821, and discussed it with him,) although he first gave us the true type of a vertebra, would have it that in all cases all the materials of every organ are present at one time or another in every animal. It may be so; but common sense and positive inquiry must compel even his warmest admirers to admit, that if every animal shows at some period of its existence the identical structure of every other, this must happen at a period of embryonic growth, so early as to render all demonstration of the fact forever hopeless.

"Of the two theories, or rather views, presented to the scientific world in 1821–22, the French and German, I preferred, with certain modifications, the German, or, in other words, adopted at once the theory of type. It was in vain that I pointed out to my esteemed friend Geoffroy that *the type* of the respiratory system was evidently aerial and aqueous, a generative system, hermaphrodite, and so on; yet the obstinacy with which he pushed his views led him to many brilliant discoveries, such as the presence of teeth in the fœtus of the whale, in the upper jaw, above the whalebone, detected soon afterward in the lower jaw by my brother and myself. The true philosophy of the teeth was discovered, then, by Geoffroy.

"In employing the four materials I have just named in constructing the teeth, Nature, we find, as usual, varies them *ad infinitum*. Sometimes it is the cement which predominates, and the bony part may be wholly wanting; or the cement may be all but absent, and the enamel and ivory seem alone to form the tooth. But she never reverses the order of their superimposition. In fishes it is the bony part of the tooth which predominates, the last formed in the teeth of man when it does form, the first formed in fishes; hence the ease with which at a certain period the teeth in fishes unite by bony union with the bones which carry them. Exterior to this, we find the ivory or dentine and enamel, as the case may be; but although the bony part ofthe tooth unites readily by bone with the jaws, it of course is not of the same nature as bone, any more than the so-called horns or antlers of deer, which unite for a time with the frontal bones. Its vitality is of short duration; and the bony union being speedily destroyed by absorption, the tooth falls or is shed, to be succeeded rapidly by others.

"As the organ which successively forms the enamel and the cement of the corona is altogether destroyed, when the tooth becomes in reality a phaneric part, it can scarcely be said that these parts of the tooth continue to be *living structures;* they have long ceased to be connected with such. But it is no doubt different with the ivory part of a tooth overlying the bony part, and which is evidently analogous to it; this retains its connection, though obscurely, with the pulp. On the final conversion of the deepest part of the pulp into what may be called by analogy the bony part of the tooth, as in the cachalot, etc., the tooth ceases any longer to be connected with the living parts by means of vessels and nerves. Then, and then only, can it be said to be a dead part, and even then, perhaps, in a modified sense.*

"In structure and arrangement the teeth of the Salmonidæ form no exception to the laws which regulate the dentition in other fishes and animals. The corona or crown is usually considered as composed of one substance, corresponding to the ivory portion of the tooth of mammals; to me it seems composed, in great part at least, of the bony substance, and may be a result of the ossification of the pulp itself. Hence, perhaps, may arise the rapid decay of these teeth and their quick succession, and the pathology of the teeth in man gives support to the idea. A very thin layer of enamel seems to cover the corona. But be this as it may, the teeth are developed on pulps which follow each other rapidly, are speedily and constantly being shed, are nearly uniform, consequently are characterized, not by any peculiar form, but by the name of the bone carrying them, as maxillary, palatine, vomerine, etc. Moreover, they are shed by a process analogous to what we see take place in the poison fangs and teeth of the ophidia generally, a process strongly resembling the casting of the antlers of the deer.

"Seeing that the number of fixed teeth in the Salmonidæ is so uncertain, I have preferred reckoning them by the number of dental mucous cavities and openings which the mucous membrane presents. While the teeth are forming or fixed, these little cavities, with the openings leading to them, remain constant and patent; when a tooth has been shed, and is not to be replaced, the fissure and cavity in the mucous membrane disappear. The dentition, then, in the Salmonidæ I have reckoned from the number of existing mucous fissures and *cul de sacs* in which there may or may not be fixed teeth.

"In an aged fish, when any particular bone becomes edentulous, these mucous figures and cavities disappear; a fine line or fold remains as a vestige merely of a structure once so complex and so full of vital energy. These changes are not limited to the soft tissues; they extend to the dentine portion of the bones composing the skeleton of the head. The little truncated conical cavities which contain the pulp, and the cones themselves to which the corona of the tooth adhere by osseous union, also disappear with the shedding of the tooth, precisely as we see in man himself, in whom the alveolar portion of the jaw disappears when the teeth are accidentally destroyed.

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* Ordinary bone is very apt to assume the character of the ivory or dentine, as in the fore part of the first dorsal vertebra of the camel.

"In the dentition of the Salmonidæ, there is first a row of teeth around the mouth, just within the edge of the jaw; these are the superior maxillary and inter-maxillary teeth. Within this row, which is complete, are two rows of teeth; they are the palatal, being carried on the bones considered as palate bones by most anatomists. The middle plane of the palate is occupied in the young of all the Salmonidæ by a double *alternating* row of teeth covered by a bone which most anatomists agree to call the vomer. This mesial row of teeth, then, is called the vomarine, and is characteristic of the nature of the fish. They are so placed in the young, and more especially in the adult, as to give the idea of a double row of teeth placed on a ridge too narrow to admit of their standing side by side.

"There are two ways of viewing these characteristic teeth: one, as a naturalist merely, and without any reference to their philosophic history; the other, tracing their history from their first appearance in the young, through their development with age, to their final disappearance; or, in other words, tracing the law of their development, and the law of edentulation in relation to the young and the adult, of all the species and sub-families, with a view to discover their philosophic history. M. Valenciennes adopted the first method—that is, he looked only to the adult, and the result arrived at, as stated by himself in the great work on the 'Natural History of Fishes,' commenced by Cuvier and brought to a conclusion by him, was, that the Salmonidæ present three distinct sub-families, characterized as follows:—

"1st. The true Salmon, with transverse teeth only on the chevron of the vomer.

"2d. The Forelle, with teeth on the chevron and a single row on the body of the vomer.

"3d. The Trout, with a double row of teeth on the body of the vomer, the transverse teeth on the chevron being absent, or not distinct.

"From a very early period of my inquiries into zoology, I was in the habit of commencing with the young or embryo—that is, I reversed the method of inquiry. In the present instance, I have adhered to this method, and the result has not disappointed me. It destroys, indeed, the simple view of M. Valenciennes, but this cannot be helped; any arrangement in natural history unsupported by Nature, and recommended merely by its simplicity and convenience, is of course inadmissible in science. On the other hand, the philosophic history of the dentition of the Salmonidæ is soon told, if we commence at the beginning, and not at the end. If, on the contrary, we commence with the so-called adult, as M. Valenciennes did, all is confusion. The adult condition itself cannot be determined. Transitionary formulæ are taken for permanent characters; generic characters are mistaken for specific, when they happen to persist in the adult. Lastly, when applied to *the universal*, they break down at once. By his method, the trout of the Lake Leman becomes a Forelle, or sea-trout; the trout of the Moselle cannot be arranged with river-trout; and the salmon of Baillon is called a trout, because when about a foot in length it has the dentition of the trout. Place beside it the young of the true salmon of Britain, and you will find that at that age it also has the dentition of the river-trout."—(*Lancet.*)

(To be continued.)

Malformed Teeth.—Any influence that will disturb the process of nutrition during the development of the animal organism, may produce malformation of the teeth in common with all other parts of the body But as these disturbing agencies are both numerous and diversified, it is extremely difficult to determine the relative influence of one or more of such in causing any particular abnormity. Hence, although it may be to some extent true that certain deformities of the teeth are occasioned by mercury and the syphilitic diathesis, as maintained by Mr. Hutchinson and others, yet the evidence does not seem to be sufficient to prove that such malformations are always thus induced. Some observations upon this point are presented in the following extract from a report of the proceedings of the Pathological Society of London, published in the *Lancet.*

"Mr. NUNN showed two casts from the teeth of two undoubtedly syphilitic subjects, showing the alterations from the normal type, which it had been previously shown that syphilis produced; one from a child at eight, and another at fourteen years of age.

"Dr. MURCHISON asked whether this condition of teeth had not been found in perfectly untainted children?

"Mr. WM. ADAMS was certain he had met with these characters in the teeth of non-syphilitic children, in whom it might have been caused by other means, as mercurial treatment, etc.

"Dr. O'CONNOR thought these characters might be caused by the excessive use of mercury, and he believed he had traced them to the use of that drug.

"Dr. HARLEY considered that such teeth occurring at six or eight years of age were physiological and not pathological conditions. The milk teeth will commonly at that age show these marks.

"Dr. PEACOCK thought the specimen in question was not a fair illustration of Mr. Hutchinson's views.

"Dr. BRISTOWE and Dr. R. BENNETT coincided with the above remark.

"Mr. BROOKE believed this condition might be due to some morbid influence on the early teeth, but not necessarily to a syphilitic one.

"Mr. NUNN replied that he did not bring them to prove that such teeth were necessarily always syphilitic, but simply as two specimens from patients who are actually laboring under hereditary syphilis. Here were two undoubted subjects of syphilis, and here were the teeth; but he made no assertion respecting any other teeth."

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"*Cast of Teeth from a Syphilitic Child.*—Mr. BARWELL stated that at the time he had the cast taken, he believed the case to be exceptional to Mr. Hutchinson's views, and that the child was not the subject of hereditary taint. Subsequently, however, he had ascertained that such was not the case, inasmuch as the father had suffered from the disease. The child was now about thirteen.

"Dr. MURCHISON remarked that as Mr. Hutchinson was present, he should like to ask him whether he had not often met with these malformed teeth in patients not the subjects of hereditary syphilis.

"Mr. HUTCHINSON replied that he did not believe one-tenth of the cases of malformation of the teeth which came under notice had anything whatever to do with syphilis. The malformation which was diagnostic of that disease was a special, very peculiar, and comparatively rare one. It consisted of dwarfing and notching of the central upper incisors of the permanent set. If this condition of this pair of teeth were not present, all other deformities should count for nothing. He had met with no single case tending to shake his confidence in the value of this condition as a reliable symptom. On the contrary, all recent observations had tended to confirm it. It was, however, a condition which varied in degree, and which required some practice in its appreciation. In many cases of hereditary syphilis the teeth were but little malformed, and in some they might even escape altogether. He believed that the malformation was due to inflammation of the dental structures at an early period of infantile life. If a syphilitic infant escaped an attack of stomatitis, the teeth would probably escape malformation, just as if, should no inflammation of the nasal passages occur, the nose would escape the deformity which is usually so marked in these children. He had had many opportunities for seeing families of syphilitic children, and had always found the malformation of teeth most marked in the eldest, and becoming gradually less so in the younger members. He would venture to add, as a precaution, that these peculiarities were never met with in the first set of teeth, since many mistakes had come to his knowledge in consequence of inattention to this fact."—(*Ext. from the Proceed. of the Pathological Soc. of London; Med. Times* and *Dublin Med. Press.*)

"*The Sucking Apparatus of Infants.*—Some time ago, Messrs. Charles Robin and Magitot brought the results of their researches on the mucous membrane of the gums in the fœtus and newly-born infants, before the Societé de Biologie; and the following are a few of the most important particulars regarding the sucking apparatus of infants: On the dental cartilage of both jaws there exists, in the region of the canine teeth, a membranous protuberance, which is most conspicuous in the lower jaw, and sometimes entirely wanting in the upper. This prominence, which disappears three or four months after birth, shows the following peculiarities: It has a slight impression in the centre, and on microscopic examination, two or three papillar prominences may be distinguished, which are very vascular, and thereby capable of erection. The protuberance on the right side of the lower jaw is generally connected with that on the left, by a membranous seam, which is also furnished with papillæ, and very vascular. The edge of the lower jaw, therefore, possesses, as it were, a thin and small lip, extending from one canine tooth to the other, and evidently serving the purpose of sucking.

"In some individuals this membranous fold is very thick, but it is always movable forward as well as backward. In such instances the prominences are replaced by the ends of the fold itself being larger; so that it resembles a soft and almost œdematous tubercle of oval form. Similar tubercles, only less broad and prominent, exist on the upper jaw. If the surface of the membranous fold is closely examined, it appears to be slightly wrinkled: which is due to the rather voluminous papillæ with which it is furnished; these are rounded above, and covered by a delicate layer of epithelium cells, like the rest of the gums; through which the top of the papillæ are distinctly visible. The reddish color of this membrane may be easily distinguished from the whitish appearance of the fibrous tissue in the mucous membrane of the gums, which is covered by it; and where it passed into the gums, wrinkles are no longer visible. The prominences described above are sometimes wanting, but the membrane itself is always present; and ends either at the canine teeth, or a little beyond them."—(*Paris Correspondent of Med. Times and Gazette.*)

Reunion of Dissevered Animal Structure.—The following case, translated from the *Campagne de Russie* of Baron Larrey for the *Berkshire Med. Jour.* and republished in the *Buffalo Med. Jour.*, affords another striking example of the great superiority of conservative over destructive surgery: "A Russian colonel had received from one of our troops a sabre-cut which had completely separated the nose from its base. The sabre striking obliquely, had cut through the superior maxillary bones, completely down to the mouth through the hard palate, so that the nose and anterior portion of the maxillary bone fell over upon the chin, attached and suspended only by a narrow strip of flesh at the corners of the mouth. We could see, on one side, the whole extent of the nasal fossæ and the cavity of the mouth, without its row of teeth; on the other, the flap, consisting of the whole nose, the upper lip and palatine arch, lying over on the chin. One of my assistants, having found the flap cold and attached only by the two points which I have mentioned, was going to remove it and dress the wound when I arrived. I put aside the surgeon's scissors, and after examining the flap prepared to replace it. Removing the clots from the nasal fossæ with some difficulty, I then detached that portion of the palatine arch which was attached to the flap, which included the anterior half of the upper alveolar arch. The line of the wound on one side was between the canine and the first bicuspid teeth; on the other, between the two bicuspids. I removed also from the flap many pieces of the nasal bones and processes of the maxillary bone. I then restored the nose and lip to their place, retaining them with the interrupted suture, beginning at the bridge of the nose, and descending successively on the two sides, until the edges were united by ten parallel sutures, and covered the whole wound with a light compress with salt water. I introduced into the nostrils two pieces of large-sized gum-elastic sound, to preserve their shape and size —having united the sounds at their outer end by a thread to keep them in place. Graduated compresses were placed on the sides of the nose, retained by a bandage, which completed the dressing.

"I had the satisfaction of learning, on my return from Moscow, that this officer had entirely recovered, and without any deformity. The cure is remarkable from the severity of the wound and scarcity of vessels which keep up communication between the flap and the integuments of the face. Vitality was restored in the nose, and its point of union was exact and perfect."

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Regeneration of Bone.—"Dr. Demeaux sent in, on Monday last, to the Academy of Sciences, a paper containing fresh evidence of the regenerative powers of the periosteum in cases of injury to the facial bones. In one of the examples adduced, the patient, a young man of twenty-two, underwent in 1855 an operation for the removal of an enormous naso-pharyngeal polypus, the pressure of which on the palatine arch had caused the absorption of about two-thirds of an inch square of the bony roof of the mouth. Six years later—a few weeks back—Dr. Demeaux again examined this patient, and found that the whole of the missing osseous tissue had been replaced by periosteal regeneration, which in this case was spontaneous, and unprovoked by artificial means. A second instance is still more illustrative. In October, 1859, a young soldier returned to France after the Italian campaign. He had been wounded at Solferino by a musket-ball, which had fractured the left superior maxillary. The day after the battle the surgeon on duty extracted the projectile, together with several splinters of bone, in one of which three molars were firmly implanted. On examination, about half of the palatine roofing was found to be devoid of bone, the mucous membrane constituting the only wall of separation between the mouth and nose. In consequence of the want of solidity in the palate the functions both of articulation and deglutition were impeded. During the summer of last year, when Dr. Demeaux again saw this man, the bony plate forming the roof of the mouth was found to be quite entire, and the impediment of speech and the inability to swallow had disappeared. The above examples are highly suggestive, and operative surgery will doubtless before long have turned to account the bone-making function of the submucous periosteum in the treatment of cases of congenital cleft palate."—(*Paris Correspondent of Lancet.*)

"*New Method of giving Chloroform.*—At a recent meeting of the Obstetrical Society, Dr. Simpson described a plan of administering chloroform which he has now adopted in preference to that at present in use here. The present mode is to fold up a handkerchief and pour into the hollow a quantity of chloroform, and then hold it at some distance from the face, so as to admit of atmospheric air being inhaled along with the vapor. The new plan is to lay a single layer of handkerchief over the face, and let the chloroform fall on it drop by drop. The advantages are these: 1. That there is less danger to the patient from the small quantity applied at a time. 2. That anæsthesia is more speedily produced. 3. That the quantity of chloroform required is less. Various gentlemen who had made trial of the plan confirmed the value of this process; and Dr. Young in particular, stated that he had kept a patient narcotized for ten hours with two ounces and a half of chloroform."—(*Brit. Med. Jour.* and *American Med. Times.*)

"*Preparing Caoutchouc for Dental Purposes*, etc. R. A. Brooman, Fleet Street, London. A Communication. Dated March 20, 1861. (Not proceeded with.)—The inventor treats the ordinary red caoutchouc of commerce in the following manner to render it suitable for moulding dental pieces, (artificial gums,) and other objects to which the flesh-colored material is applicable: The red caoutchouc, colored with vermilion or other pigment, is first softened by sulphide of carbon, ether, chloroform, or other solvent employed in proportions varying from one-quarter up to an equal weight with the caoutchouc; when so softened or dissolved an appropriate quantity of any of the white pigments specified is added for the purpose of altering the color from red to pink, and to increase the brilliancy a little carmine may occasionally be added with advantage. Oxide of zinc is used alone or in conjunction with carbonate or sulphate of baryta, sulphate of strontia, or of manganese, phosphate of lime, calcined alumina or silica, or the latter in its precipitated condition. The decolorizing agent is usually introduced in quantity about equal by weight to that of the red caoutchouc, and in some cases a small proportion of ordinary caoutchouc solution is required for the purpose of giving the paste more elastic qualities. After moulding, the dental piece or other object must be solidified by exposure in a closed vessel to temperatures ranging between 300 and 335 degrees Fahrenheit, from half to three-quarters of an hour being generally sufficient to communicate the requisite degree of hardness. The flesh color will be improved by exposing the piece to the influence of the sun's rays, either directly or when immersed in a bath of alcohol."—(*Chemical News.*)

"*The Action of Porous Bodies in Inducing Chemical Combinations.*—M. B. CORENWINDER showed some years ago that partial combination of sulphur and hydrogen may be effected by bringing the two bodies together in the presence of pumice-stone at a red heat. He has recently shown that the vapor of water may be also decomposed by sulphur, when some porous body at an elevated temperature is made to intervene. The experiment was conducted as follows: Some fragments of recently calcined pumice-stone were placed in the middle part of a glass or porcelain tube; one end of the tube was then filled with pieces of sulphur, a plugget of asbestos being placed between the cork and the sulphur. A tube, by which steam could be sent in, passed through the cork. The pumice-stone was then heated to redness, and the sulphur made to slowly volatilize. At the same time a current of steam was cautiously sent through. After a little time, sulphuretted hydrogen was produced in abundance. A still more decided result is obtained if pure calcined silica be substituted for the pumice-stone. The porous body is totally unacted upon in all cases.

"The author directs the attention of geologists to these results; he thinks that they may explain the presence of sulphuretted hydrogen in certain volcanic emanations."—(*London Pharm. Jour.* and *Amer. Jour. of Pharm.*)

"*New Fusible Alloys: Remarks on determining the Melting Point of Metats, etc.* By B. WOOD, M.D.—Seeing that the 'fusible metal' described by me some time ago (consisting of cadmium 1 to 2 parts, tin 2 parts, lead 4 parts, bismuth 7 to 8 parts, and melting between 150° and 160° Fahr.,) has been viewed with some interest by men of science, I take the liberty to offer through your journal a short description of another alloy, which perhaps has equal claims to scientific notice. It consists of cadmium 1 part, lead 6 parts, bismuth 7 parts.

"This alloy melts at about 180° Fahr., being nearly midway between the melting point of the old fusible metal, consisting of the *three* metals, tin, lead, and bismuth, and that of the alloy above mentioned, consisting of the *four* metals, cadmium, tin, lead, and bismuth. It is remarkable as exhibiting the fluidifying property of cadmium in certain combinations, (a property to which attention was directed in vol. xl. No. 2, of this journal;) and also in the fact that, while the mean melting point of the constituents composing it is much higher than that of those composing the old fusible metal discovered by Newton, (being in the former case about 540°, in the latter 500°,*) it melts at a much lower temperature. It is more fusible than any other *alloy* yet known consisting of but *three* metals.

"It appears to be the most fusible form of mixtures of cadmium, lead, and bismuth, any material variations from the proportions stated resulting in a higher melting point. Thus, taking the extremes on either side, a mixture of 1 part of cadmium, 1 of lead, and 2 parts of bismuth, barely softens in boiling water, while one of 1 part of cadmium, 10 parts lead, and 11 bismuth, becomes fairly soft. A mixture of 1 cadmium, 6 lead, and 6 bismuth, barely *melts* or fluidifies in the same, and of 1 cadmium, 6 lead, and 8 bismuth, becomes fairly fluid. From these points the fusibility is increased or diminished as we approach to or recede from the proportions of the formula.

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* Taking the melting point of tin as 440°, of bismuth 480°, lead 600°, and cadmium 600°, (being the same as lead, notwithstanding it is placed in most of the books as low as 442°,) then the mean of 1 part tin, 1 lead, 2 bismuth, is 500°; or of 3 tin, 5 lead, 8 bismuth, 510°; the mean of 1 cadmium, 6 lead, 7 bismuth = 540°. That of 1 cadmium, 1 tin, 2 lead, 4 bismuth, 520°; or of 1½ cadmium, 2 tin, 4 lead, 7½ bismuth, 518°.

"The alloy presents a clear, brilliant, metallic lustre. It does not tarnish readily; whereas the combinations of lead and bismuth are remarkable for the facility with which they not only tarnish, but oxidate upon the surface. Its color is what would be denominated 'white,' but more strictly a bright bluish-gray, very nearly resembling platinum in hue and lustre. When cast, its free surface presents a white, frosted appearance. It is very flexible in thin plates, and the fracture is hackley, but when broken in thicker bars the fracture is smooth, resembling that of tempered steel. It is malleable, although not perfectly so, cracking upon being reduced one-third to one-half of its thickness. In hardness it is the same as bismuth, or nearly the same as an alloy of 2 parts of lead and 1 part of tin, (coarse solder.) which it resembles more nearly in other respects.

"It may be that more approved methods of measuring temperature will give the alloy a still lower melting point than above ascribed to it.

"I see by a notice in the June number of this journal, copied from a European publication, that Lipowitz gives my 'fusible metal' a much lower melting point than I had indicated. He found, it is stated, that an alloy composed of 3 parts cadmium, 4 tin, 8 lead, and 15 bismuth, 'softens between 131° and 140° Fahr., and near 140° becomes perfectly fluid;' whereas, finding the most fusible formula to become fluid so as to be fit for use in casting, at 160° F., and to harden at 150°, I designated its fusibility as 'between 150° and 160°.' Of different variations the proportions of the following formulas, or proportions intermediate between the two, give the lowest melting point, which appears to be identically the same in either case, being 150°, or very nearly, viz.: cadmium 1 part, tin 1 part, lead 2 parts, bismuth 4 parts; or cadmium 3 parts, tin 4 parts, lead 8 parts, bismuth 15 parts.

"Determining the melting point of these by means of a mercurial thermometer of high range, and not graduated to indicate fractions of degrees, the bulb being immersed one-fourth of an inch in the melted metal contained in a small porcelain crucible, it was observed that, on cooling, the metal was fluid around the bulb at 150°; at 146° or 147° it was still soft; the mercury then *rose* to 150°, and after remaining stationary there some moments the metal congealed completely, after which the mercury still remained at the same point for some moments before it began to fall. In the proportions of 1 part of cadmium, 2 parts of tin, 4 of lead, and 7 of bismuth, the alloy congeals at 154°.

"There are difficulties in the way of exactitude in measuring the melting point, and we find a want of uniformity in the results of different experimenters, owing partly, perhaps, to imperfections in our instruments, partly to the different modes of using them, and partly to the want of a uniform rule and standard of measurement. What *is* the 'melting point?' or what is the precise condition of a metal when it is said to 'melt?' Are we to reckon from the point at which it softens? or fluidifies? or congeals?

Some alloys pass from one condition to the other at nearly the same temperature, while with others there is a difference of fifty degrees or more. There is generally, too, a difference between the point at which metals *become* soft or fluid in heating, and that at which they *remain* fluid or soft on cooling, however carefully the process be conducted. Again, *how* should we measure the temperature of a metal in the melted state? Should the bulb of the thermometer be submerged, or is it sufficient to simply dip the lower extremity? If we adopt the latter mode, noting the temperature, and then plunge the bulb deeper, the mercury will be observed to rise. In taking the temperature of the atmosphere, the medium envelops both bulb and stem. When the bulb is partially immersed in a hot liquid, the upper part of the contained mercury radiates a portion of the heat received by conduction from the lower. Suspending the bulb in hot water to the depth of half an inch, the mercury in the stem stood at 184°; while on partially withdrawing it, so that only its extremity remained in the water, the mercury fell to 170°. In other instances the difference was about 15°, more or less. The lower strata of the fluid in such cases may indeed be hotter than those near the surface, as receiving the heat sooner and parting with it later: but this argues a difference of temperature in the upper and lower strata of mercury in the thermometer bulb when placed in like situation, and if it were long enough the effect of the heat acting upon the lower extremity might be neutralized by cold applications to the upper. A piece of metal may be held between the fingers by one end while it is melting at the other. It is true, metals when fluid conduct heat more readily. But if we examine different portions of a mass in this condition, we shall find marked inequalities of temperature, (nor is equilibrium restored so long as the metal remains fluid, except the whole be kept in this condition in a uniform medium.) Thus, when cooling, the outer portions part with their heat faster than they receive it from the centre, and consequently are first to congeal.

"But there needs no proof to show that the indications of the thermometer will be erroneous when the greater part of the bulb is in a cooler medium than the metal under examination. The facts referred to only show that the error may be greater than is generally supposed. They also point to difficulties in the way of obtaining exactitude by the other method. But, what is more directly to the present purpose, they speak the need of uniformity in the mode of measurement, on the part of those not provided with means of obviating these difficulties, that our *approximations* to the truth may be uniform.

"When the bulb is immersed in the melted metal, the lowest temperature at which it will move freely may be taken as the melting point, and that at which it adheres, as the point of congelation. The cylindrical bulb is more convenient than the globular, and it would be better still if in shape of an inverted cone."—(*Franklin Institute Journal.*)

Local Anæsthesia.—"DR. FOURNIER has addressed to the Academy of Sciences a paper on the subject of Local Anæsthesia, and details a new process for its production, which is called 'Chloracetization.' His method for producing local insensibility to pain is that of exposing the part to be acted on to the fumes of a mixture of acetic acid and chloroform. 'If,' he says, 'in a room, the temperature of which is upwards of 63° Fahr., the mouth of a thin glass bottle, half filled with a mixture composed of equal parts of pure crystallizable acetic acid and chloroform, be exactly applied to a clean and healthy skin, not deprived of its epidermis, and if this phial be constantly maintained at the temperature of the hand, complete anæsthesia of the part included by the orifice of the bottle will be attained.' M. Fournier proposes to utilize this discovery for surgical purposes by directing the vapors of the chloro-acetic compound upon the parts to be rendered insensible to pain by means of a retort, the rest of the limb being protected by diachylon plaster from the benumbing action of the anodyne emanations; and suggests the employment of his method in those cases where general anæsthesia may be deemed inadmissible."—*(Paris Correspondent of Lancet.)*

"*On Poisoning of Watchmakers by Copper*—DR. PERRON, of Besançon, has made some researches on the above subject, which are of interest. For several years the manufacture of watches in Besançon has greatly increased; there are now about 300 watch manufacturers, who employ about 3000 workmen. These workmen continually handle gold and copper, and statistical observation has proved that mortality by consumption is exceedingly great in this class. Out of 200 deaths in watchmakers, no less than 127 are caused by tuberculosis, and of the deaths by consumption in the whole population of Besançon, the watchmakers furnish 40 per cent., while the proportion of the number of watchmakers to that of the other population is not 5 per cent. Dr. Perron believes the following to be the causes of this great mortality: The sitting posture which the men are obliged to retain for so many hours in the day, and the necessity of remaining in a cold room without exercise; the irritation of the lungs by the metal dust, and the paroxysms of fever, caused by the absorption of copper. The latter is thought to be the most important cause, by Dr. Perron, and he gives the following description of the symptoms of chronic poisoning by copper, as they occur among these men: The pulse is frequent, the skin hot, the throat dry; most of them complain of pain in the epigastrium, in the region of the kidneys, and in the head; many suffer from indigestion, enteritis, diarrhœa; and others have a feeling of constriction, and an acute pain in the throat. The teeth are in nearly all such cases colored more or less green, and almost bronzed. These symptoms are especially striking in the apprentices, who are almost exclusively occupied in filing copper. Many get accustomed to the injuries of their avocation, but others become so ill a few weeks after having first entered the shops, that they can no longer continue to work, and are compelled to embrace another calling.

"In many cases the symptoms take a very severe form; acute colics, fever, burning thirst, vomiting, diarrhœa, or obstinate costiveness which lasts from twenty-four to thirty-six hours, are observed. The nutrition is also mostly impaired, the muscles are badly developed, the complexion haggard, the look miserable. The continual absorption of small doses of copper, and its local and direct action, the frequent repetition of toxic and febrile symptoms, and the cachexia at last produced by it, are the causes of the prevalence of consumption among these men. Dr. Perron proposes as a prophylactic measure, that emaciated persons with tuberculous diathesis, should not be allowed to continue this calling, and to recommend as much exercise as is possible, abundant and succulent food, ventilation of the workshops, great cleanliness, baths, the use of aperients and diaphoretics, and the wearing of moustaches."—*(Med. Times and Gaz.)*

"*Solidified Creosote.*—The great fluidity of creosote frequently occasions much inconvenience when it is applied for caries of the teeth, and M. Stanislas Martin, to obviate this, recommends the combination of fifteen parts by weight of the creosote with ten of collodion. A gelatinous consistency is thus obtained, and this preparation has the advantage over simple creosote in forming a varnish which closes any orifices in the carious teeth against the access of air. 'Creosote coagulates albumen, to which property is probably due its astringent and hæmostatic action. We believe that this new form of administration will allow of surgeons employing this body whenever they are in want of a stimulant agent combined with an isolating substance.'"—(*Bull. de Thérap.* and *Med. Times and Gaz.*)

Etiological Relations of Dentition with Hip-joint Disease.—The following remarks upon this subject occur in one of MR. JOHN HILTON's instructive lectures on "Pain and the Therapeutic Influence of Rest," published in the *Lancet:* "A little child, however, suffering from such so-called obscure or uncertain symptoms of hip disease, is likely to suffer from a misinterpretation of the symptoms, on the supposition that they may be caused by teething, or perhaps rheumatism; and these, I may say, are very common professional phantoms with the surgeon when considering such a case, so that all the attention is given to the innocent teeth and gums, which are scarified and punished unfairly for sins which do not belong to them, while the hip-joint symptoms are allowed to continue, or are left to themselves, and thus to constitute what may be a fatal mistake. The other day I thought I would call and speak to Mr. Thomas Bell, as to what he had observed in his large experience on this matter, and his opinion coincided with my own views as to this misplaced association of teething and hip disease. He added: 'I wish you would also intimate that a very great deal of mischief is often done to the evolution of teeth by scarifying the gums too deeply.' And it is obvious that it must be so. If the gums are scarified deeply, the rudimentary apparatus, which determines the development of teeth either in their direction or integrity, must be very much interfered with by a reckless or badly-directed incision upon the gums. I am anxious to inculcate the importance of recognizing or of diagnosing a case of disease of the hip-joint or its neighborhood at a period before the full manifestation of those symptoms which are spoken of and traced in books as the characteristic symptoms of morbus coxarius. I must admit it is still the opinion of some surgeons that inflammation or irritative disease of the hip-joint is sometimes associated with, or induced by, unhealthy teething. I cannot say that it is not so, but I think it must be a comparatively rare occurrence, for it certainly has not fallen to my lot to see more than one or two cases which could give any legitimate support to such an interpretation. On the other hand, I certainly have seen a great number of cases in which teething has been said to be the cause of hip-joint symptoms, but has turned out to have nothing to do with them, and a great deal of time has been lost, and the patient has been placed in danger by the delay."

Origin of Pus.—In the course of a review of Holmes's System of Surgery, (*Amer. Jour. Med. Sci.,*) "C. H." makes the following quotation therefrom of some remarks upon this subject, by MR. HOLMES COOTE: "'There are two doctrines as to the origin of pus. First, that the fluid is formed out of the exuded plasma of the blood, (Rokitansky.) Secondly, that it is formed by a rapid cell-growth, set up by irritation in the parenchyma itself, (Virchow.) The cells from which Virchow considers pus-cells to be generated are the corpuscles of areolar tissue, (*Bindegewebs-körperchen,*) which he supposes to permeate nearly every part of the frame. This latter view is the one more generally adopted, although the universal existence of these corpuscles has yet to be proved. Modern pathologists do not regard pus as degenerated lymph. The white corpuscles of the blood, the lymph corpuscles of the chyle, and pus corpuscles are identical and indistinguishable. They differ in their mode of origin. The two former are generated within a vascular system normally. Pus is generated external to the vascular system abnormally. Lymph corpuscles cannot escape from the blood, and pus corpuscles cannot enter it, except by rupture of vessels; consequently the latter cannot be regarded as a degenerated form of the former.

"'Inasmuch as pus consists of myriads of cells swimming in serum and formed at the expense of the tissues, it follows that prolonged suppuration is accompanied by a corresponding amount of emaciation and waste of the body. Pus may be readily removed by the absorbents. The serum is taken up as any other fluid. The pus-cells either dry up, when they form a cheesy, pultaceous mass, which may ultimately become cretaceous, and has often been mistaken for tubercle, or the fatty matter undergoes granular disintegration, the cell-wall softens, and the whole is removed in the usual manner.'"

" *The Congress of German Dentists.*—The 'Central Union' of German Dentists, which was established two years ago, at Berlin, held its third annual meeting in Dresden, at the end of August. Professor Heider, of Vienna, presided. The following points were discussed:—First, the best means of stopping carious teeth. The majority of speakers declared gold to be the best material for it, and that amalgams or cement were the only substitutes for gold which could be safely employed. Among the former, the so-called 'ash-mass,' a compound of fine gold, silver, and pure tin, was recommended. The best means of destroying the diseased pulpa before stopping the teeth was then taken into consideration; the galvanic cautery and arsenic, cautiously applied, being pronounced the best means for attaining this end.

"For the treatment of neuralgia of the substantia eburnea, the use of strong caustics was dissuaded; and tannin, creosote, and nitrate of silver were declared to be preferable. The other points discussed were the best apparatus for giving the teeth a straight position, and the use of caoutchouc in dental surgery."—(*Leipzig Correspondent Med. Times and Gazette.*)

MISCELLANY.

The Paris correspondent of the *Lancet* says that M. Trousseau, in treating of the differential diagnosis between a phlegmon of the face and an inflammation of the parotid gland, put into successful practice "a method of distinction suggested by M. Archambault, and which seems infallible for the recognition of parotitis." It is obvious, however, that it can only be of any pathognomonic value during the stage of suppuration. "This consists in opening the patient's mouth widely, so as to expose the orifice of Steno's duct, out of which, by pressure on the gland, if parotitis exist, a drop of pus can be expressed. The pus did appear in this case, and an inflammation of the gland was consequently diagnosed —a circumstance of which the death of the patient next day permitted the verification. The second case referred to by M. Trousseau presented almost analogous symptoms, with the difference, however, (a considerable one so far as the patient was concerned,) that the result was not of a fatal character."

The same writer refers (*Ibid.*) to the following fact, which "may be of use to students in aiding them to copy anatomical diagrams, that a very good substitute for tracing-paper may be manufactured with ordinary paper by the help of a little benzine. A sheet of ordinary Bath post, moistened with this oil, renders the material perfectly transparent; the tracing may then be effected, and within a short time the volatile fluid has evaporated and left the paper perfectly opaque and clear as before. The drawing sustains no detriment by the operation."

It is stated in *Championnière's Journal of Pract. Med. and Surg.*, that "DR. LAVAU, of Birac, called the attention of the Academy of Medicine of Paris to the importance of sulphuret of lime in the regeneration of bony substance. Mr. Lavau observed, more than twenty years ago, that this agent, diluted in olive oil and used in frictions to destroy itch, induces enlargement of the joints of the fingers. This remark led him to prescribe frictions with sulphuret of lime on the head of rickety subjects whose fontanelles were excessively large, or persisted beyond the normal period, and he obtained with surprising rapidity the ossification and obliteration of these membranous apertures. Mr. Lavau therefore surmises that the same treatment may perhaps be also applicable to the secretion of the periosteum in the great process of the reproduction of bone." If such is the case, this agent might probably prove useful in promoting the deposit of dentine over exposed and sensitive nerves.

In a paper upon chorea, in the *Amer. Jour. of Med. Sci.* for January, DR. J. J. LEVICK thus notices the etiological relations of the teeth to that affection: "Irritations connected with the teeth would seem to have more to do with the development of chorea than we would at first suspect. A case is reported in the *Archives Générales*, page 538, tome v., in which chorea was induced by a carious tooth, and disappeared with its withdrawal. Monro, the younger, used to state in his lectures that he had several times observed the disease to occur in children about the period of the second dentition, when the former set remained, or when the new set were shining through the gums, and that he had speedily cured the disease by drawing the first teeth, or by lancing the gums."

At a recent meeting of the Medical Society of Kings County, New York, DR. SMITH reported (*Amer. Med. Monthly*) the following interesting "case of a patient who was attacked with toothache and neuralgia, pain extending to the whole face. Patient would not bear opiates, and he gave large doses of hyoscyamus, with the effect of relieving the pain; yet at night the patient will talk almost incessantly, ask and answer questions as direct and rationally as ever, and in the morning know nothing about it; in fact she was amused and interested, the day following, with a report of her own proceedings during the night—now keeping her comfortable upon the sugar-coated assafœtida pills. Thinks perhaps this state of the patient's nights may have been brought on by the pretty free use of chloroform upon the face for toothache, in that way inhaling it for a long time."

Dr. Whitney related to the Buffalo Medical Association (*Buffalo Med. and Surg. Journ.*) a case of a "tumor over the upper incisor tooth in a boy fourteen years old. It had been twice excised by the family physician, but soon returned, and was sent to him for treatment. Ligated it, and it soon dropped off; seemed inclined to grow, and caustic was applied; at last forced an instrument down upon the alveolar process, detaching it thoroughly from the bone, and after this operation it gave no further trouble, never afterward returned."

A correspondent of the *Boston Med. and Surg. Journ.* invites attention to a new application of vulcanized India-rubber for stoppers of bottles, in the place of cork, glass, and other substances. They are said to be cheap, durable, and of extensive application for the purpose mentioned.

According to the *London Pharm. Journn.* and *Amer. Journ. of Pharm.*, "carbonized rye or rye charcoal is said to be much used in Paris as a tooth powder. The following constituents have been found by Schrader in 500 grammes of the ashes of rye: carbonate of lime, 7 grammes; 9·8 ditto of carbonate of magnesia; 7·2 ditto of oxides of iron and manganese; and 1·9 ditto of silica."

Mr. A. E. Jerome writes to an exchange, that, in experimenting to find a substitute for borax in welding purposes, he has obtained "good results from 3 parts of copperas and 1 part of sal-soda, which costs only one-fourth that of borax. I think a solution of the above would make good compound for tempering; it has the property of recovering steel that has been burnt."

In reply to a correspondent, the editor of the *Amer. Drug. Circ.* says that "to render ivory *flexible*, it should be immersed in a solution of pure phosphoric acid of sp. gr. 1·130, and left there until it ceases to be opaque. It should be then taken out, washed with water, and dried with a soft cloth. It is now so flexible that it may be bent like leather. On exposure to dry air it returns to its original hardness, but it becomes flexible again by treating it with hot water. There is no difficulty in giving to ivory various colors—black, blue, green, red, violet, etc. The process is simply one of dyeing. You are mistaken in supposing that ivory is composed chiefly of *carbonate* of lime. Like the substance of all teeth, it is mainly *phosphate* of lime, with a little carbonate, and a large quantity, equal to about one-fourth of the whole, of gelatinous matter or cartilage."

In a paper read before the Acad. of Sci., Paris, (*Brit. Med. Jour.* and *Amer. Jour. Med. Sci.*,) on phenic acid, which is one of the results of the volatile distillation of coal tar, M. Lemaire stated "that anatomical specimens and entire animals might be preserved, in a fresh condition, in vessels smeared over on the inner surface with phenic acid, provided that the vessels are hermetically sealed so as to prevent the removal of the air contained in them. The bodies of animals injected with phenic acid, dissolved in water, may be kept without any alteration by the contact of atmospheric air. In this manner, the body of a man might be preserved at a very trifling expense."

THE

DENTAL COSMOS.

NEW SERIES.

VOL. III. PHILADELPHIA, MARCH, 1862. No. 8.

ORIGINAL COMMUNICATIONS.

FILLING DECIDUOUS TEETH.

BY C. P. FITCH.

THE filling of deciduous or temporary teeth is practiced by many of our best dental operators, seriously questioned by some, and entirely ignored by others. Its adoption by the profession, we believe, is not by any means general; perhaps, however, more generally practiced now than formerly. By those practicing it, there still exists a great diversity of opinion as to what constitutes the best material for meeting all the complications attending the preservation of these teeth their allotted time. It is also very questionable, with many, in reference to the feasibility of filling these teeth, or their fangs, after suffering from pulp exposure.

I propose, in the present paper, to suggest a few thoughts which have a practical bearing, and which the importance and nature of the subject seem to require. There is but little said in our standard dental works upon the subject of filling deciduous teeth. In Dr. Chapin A. Harris's Principles and Practice of Dental Surgery, on page 122, I find the following language: "Caries of a temporary tooth, if it has not penetrated to the pulp cavity, may, in the majority of cases, be arrested by removing the diseased part and filling the cavity with gold, or Hill's stopping—a preparation of gutta-percha."

The deciduous teeth meet specific requirements, or subserve certain purposes during a definite period. To secure, therefore, all the benefits arising from the preservation of these organs in a normal condition, approaching, if not actually up to the time fixed by nature for shedding them, is a matter of vital moment. Indeed, so important is it, that the beauty, utility, and to a certain extent the permanency, of the second denture depend very much upon meeting all the conditions required by the organism in the first denture.

Many parents and guardians bestow very little if any attention upon the condition of the first set of teeth, supposing it, very erroneously, to be of minor importance to the child whether these are preserved or not; that they are soon to be duplicated by the second and more permanent ones, and indeed the sooner they are removed from the mouth, the more certainly will it contribute to the comfort of the child by anticipating and preventing future pain and suffering. Indeed, utterance is frequently given to some such expression as the following: "I wish this child's teeth were all extracted, they occasion so much annoyance and distress."

So far as filling the temporary teeth is concerned, the advice of not a few dental practitioners entirely coincides with this culpable parental neglect. That such counsel is often given honestly but ignorantly, there can be very little doubt. But in its results none the less censurable or deplorable from this circumstance. Ignorance, even if coupled with good intentions, at the present day cannot shield a dentist in any degree from blame. In former years, during the infancy of dentistry, this might be set up as an extenuating plea. But with the focal light emanating from dental colleges, standard works and journals, there can be no justifiable or even palliating reason why the most humble and obscure dental practitioner should not be thoroughly read up in all that pertains to sound principles of dental hygiene, and the most approved methods of practice; and wherever the scales of justice, in the hands of an intelligent but outraged public, brings to light a minus quantity in the qualifications demanded of the present-day dentist, the special or general deficiencies will be found attributable to one or all of the following characteristics: parsimony, indolence, indifference, or an egotistical, self-opinionated idea of natural or acquired ability. A pertinacious adherence to any one of these traits is a fatal obstacle to all genuine improvement. They blunt and render obtuse the acuteness of perception; suspend or materially interfere with protracted investigation, and dwarf all the powers of intellection; in short, rendering their possessor, when enjoyed *via natura*, superficial, arrogant, vacillating, and offensive. Docility and humility always mark true nobility of character, and ever characterize the most gifted either by nature or acquisition.

A consideration of the following question is highly important. It meets the young operator upon the threshold of his practice, as well as those who have grown gray in dental toil. Should deciduous teeth always be filled? If not, what conditions determine this operation? There are in every instance attendant circumstances which should settle the question of filling these teeth, such as the age, health, and constitutional tendencies of the child; the natural longevity of these organs, and their state, in view of these facts, at the time relief is sought. It would, certainly, not be considered good practice, although it might be called sharp, to fill, indiscriminately, all deciduous teeth requiring the exercise of professional judgment. These teeth have their fixed periods of appearance and duration, yet this limit varies much in different children—with the healthy and vigorous they are much earlier in their development, and remain unaffected by caries (although this depends very much upon the habits of the child) until the appearance of the second denture; but with the feeble and sickly, suffering from hereditary as well as acquired disease, both the first and second teeth appear much later in life, and then often very defective in structure, so that frequently it is with the strictest care and attention on the part of both the operator and patient that such teeth can be protected against the ravages of decay until the appearance of the permanent teeth. It therefore becomes necessary, in view of the health and comfort of the child, arising from a proper comminution of food and a prevention of fetid accumulations in the mouth, etc.; also, in view of the perfection, usefulness, and appearance of the future teeth, that the deciduous teeth be filled whenever found firm in the arch, or but little affected by the loosening process, which always attends the eruption of the permanent tooth, unless crowded out of the arch; and whenever this occurs, the extraction of the temporary tooth is of necessity demanded.

But it may be necessary to decide in reference to deciduous teeth whose pulps are exposed, and the child suffering perhaps from an alveolar abscess. In all such instances, where there is much time to elapse before the appearance of the permanent tooth, and the health of the child permits, there should be an expectant plan of treatment insisted upon. All such teeth, when attendant circumstances would seem to warrant a favorable issue, should be relieved of pain, surrounding parts restored to health, and then suitably plugged. There are, unquestionably, constitutional tendencies or susceptibilities which would render final results unpropitious—or, in other words, indicate an opposite course of treatment. Whenever reasonable or well-grounded fears are entertained that medication would be a failure, the tooth had better be at once removed, and then guard as much as possible against lesser evils which are very apt to ensue. The constitutional peculiarities above alluded to may be scrofula, scorbutus, neuralgia; possibly it may arise from an hereditary syphilitic taint, or it may be from the sequela of one of the more virulent or major exanthematous diseases, complicated with much consequent local inflammation, involving both the soft and hard structures.

A question at this point naturally arises: Should the fangs of deciduous teeth be filled? An answer to this question will depend very much upon the character of the material intended to be introduced into the root. If the inquiry has reference to the use of any material of a metallic nature, I reply, better not fill the root; but if reference is had to a non-conducting, easily-introduced, and readily-adapted substance, which will act kindly upon the dentinal and contiguous structures, I answer, invariably fill the fang and obliterate as nearly as possible the fang canal. My reasons for preferring a non-metallic material for filling the fangs of these teeth, I will briefly state. The fang canal in these teeth is quite large, and the peripheral wall in consequence somewhat thin. The amount of material required, and its ready conduction of heat and cold, in certain pathological conditions, through direct and reflex nervous action, would, undoubtedly, provoke congestion and inflammation in adjoining parts, establishing results vexatious to the child, if not subsequently necessitating the loss of the tooth. Again, absorption or disintegration of the fang commences at a certain period, and this process may have enlarged the root foramen previous to the time of filling it, so that there would be great danger of introducing the stopping material through this fang opening. The results of this accident, if injury be inflicted upon a nerve, could readily be anticipated. But whether this disintegration of the root is in progress or not, at the time the operation of filling is performed, it is soon to commence; and as it advances, a metallic point or spur, the shape and length of the original fang canal, would very likely be found occupying its place, and materially interfering, it may be, with the approaching permanent tooth. Gold is frequently used for this purpose by reliable dental practitioners, yet, as I think, not without risk of untoward results. Another reason. When gold is introduced into the fang of a temporary tooth, thoroughness is just as important as when plugging the fang of a permanent tooth. The same conditions determine results as certainly in the former as in the latter case. But the age and restlessness of the child at times render it an impossibility to secure a fang filling at all approaching perfection. But if the filling is rendered perfect by carefulness and a thorough manipulation, accompanied, it may be, by a tempestuous sitting, yet there is still great danger of subsequently encountering one or more of the results above enumerated. All the circumstances and requirements connected with this operation seem to indicate the use of a plastic material.

But why is it necessary to fill the fangs of these teeth at all? Why not leave them open and fill the cavity of the tooth, since they are so soon to be replaced by those more permanent?

Whenever there is evidence that the permanent tooth will soon erupt, better not fill either the fang or tooth; but if necessary to save the tooth a period which requires its plugging at all, the fang should invariably be filled with some material. If left open and the tooth filled, it becomes a nidus for the formation, accumulation, and retention of fetid, purulent matter, which may soon occasion the tooth's removal; or if retained, as sometimes is the case, it proves the source of offense and much suffering. What material is best adapted for this purpose? In thinking upon this subject, it occurred to me that the most appropriate material would be that which could be taken up by the absorbents, and become pabulum for the future tooth. Perhaps some form of lime might be used with advantage. If it did not subserve the purposes of nutrition, it would be disintegrated, most probably. Either the carbonate, sulphate, or phosphate might be employed. I can speak with no certainty upon this point, never having used either. But in my own practice I have been very successful in using cotton saturated in creosote, and the excess of creosote pressed out previous to introduing it into the fang of the tooth. It should be carried at first gently to the apex of the root, or so far as the root extends, and then should be packed quite dense, care being taken not to carry it beyond the fang. It acts as an antiseptic, preventing the formation of purulent matter from plastic exudation, and from the remains of nerve structure, etc. With this material the canal of the root can be nearly if not entirely obliterated, depending upon the denseness which has been reached in the packing process. In its results it seems to exert influences highly beneficial, and to answer the end sought to a very considerable degree. I have seen deciduous teeth, previously troublesome, treated in this manner, preserved until nature, having no further use for them, cast them off.

As to the material for filling the cavities of deciduous teeth, I have long entertained the opinion that some plastic, or non-metallic substance, was more suitable than amalgam, tin, or gold. It should possess in some degree the following characteristics: a freedom from exciting any constitutional mischief or local deleterious sequela; its plastic properties should render it of easy introduction into the cavity; at the same time it should be susceptible of being made sufficiently dense, and should resist chemical action and salivary disintegration to an extent at least sufficient to insure the preservation of the tooth the required period; it should be a non-conductor of heat and cold, so that the large pulp need not be unduly irritated, and consequently destroyed. That much of the congestion, etc. which frequently occurs in and about a tooth immediately subsequent to the operation of filling, and I may add remotely, are owing to direct and reflex nervous action, induced by repeated and continued thermal shocks communicated to the pulp through metallic stoppings in both permanent and deciduous teeth, there can be little question. Especially is this apt to be the case with the deciduous teeth whenever the dentinal septum between the filling and nerve is moderately thin.

Cheapness should be another consideration. This, by many, is regarded as a small matter, and should never be permitted to have any influence upon the patient in deciding this operation; or, in other words, the estimate placed upon it should be graduated by the cost of it. This would be admissible, perhaps, if our patients were all wealthy, or if none other than the rich needed dental services. While the wealthy should ever be made to compensate amply for these frequently annoying operations, there should always be considerations of liberality toward those in more moderate circumstances. Parsimony should never be encouraged, but misfortune, limitation of means, and a numerous family may call for the exercise of a dentist's generosity in studying the pecuniary interest of his patient in selecting a material for this class of dental operations which will answer every purpose experienced by the employment of a more expensive material.

Hill's stopping, os artificiel, and osteoplastic will be found to answer all the indications in filling these teeth. It is exceedingly difficult, at times, to make a perfect gold stopping in a child's mouth; arising from the age, timidity, etc. of the young patient. An imperfect gold filling is no better than, nor even as good as, a perfect plastic stopping.

From these considerations, allow me, therefore, most respectfully to call the attention of all dental practitioners, hitherto neglecting this practice, to the importance of filling deciduous teeth with some plastic material meeting the conditions as above noted, and at the same time harmless to the teeth, mouth, and constitution. I will also suggest this question: Is there not, in some instances, an imperative duty resting upon the dentist, viz., the proper education of parents and guardians, confiding the care and preservation of their children's teeth to his skill and integrity, concerning the importance of filling this class of teeth; also the duty of calling up thought wherever entire negligence is manifested? Much of the indifference and neglect discoverable in any community are unquestionably owing to a great destitution of intelligent views upon this subject; and with a generous, general dissemination of light touching its importance, would there not be a radical reformation respecting its practice?

PHILADELPHIA, February 10, 1862.

FILLING DECIDUOUS TEETH.

BY WM. H. ATKINSON, M.D.

Read before the New York Society of Dental Surgeons, December 11th, 1861.

THE old adage, "take care of the pence, and the pounds will take care of themselves," may very properly be rendered by the dentist as follows: "Take good care of the primary teeth, and comparatively little care will be demanded for the permanent teeth."

The whole profession, as a body, is derelict in duty to the dear children of their charge. Good operators, too, often tamper with and fill or extract children's teeth as if they were of but very little consequence, when in reality they require more skill and constant watching to effect the best results than the permanent teeth usually do.

All teeth are but a fluid mass of plasm during the early stages of their evolution, in which condition they are very easily acted upon by deleterious agencies affecting the circulation of blood crasis, and hence demand close and strict observance to ward off the evils portending both sets of teeth under these circumstances. The teeth of children who are healthy and accustomed to live on coarse, hard food, thus calling for their vigorous use, are seldom in need of filling; because the almost constant munching of fruits and nuts, roots and crusts, keeps them clean and prevents formations of acids so destructive to the poorly-organized and little-used teeth of children of the well-to-do families, who render active mastication unnecessary to fit the bolus for deglutition, by supplying soft, luscious, and too rich foods to their dear offsprings; in a mistaken tenderness, which they are sure to have evidence of in aching and distorted, partially-developed, imperfect teeth; whereas they should look to the real after-interests of their children by obeying the law of life, which is action, "equable, vigorous, and persistent," instead of arresting every demonstration of it, as a boisterous and vulgar indulgence, unbecoming decent children of a genteel parentage. Parents, and those in charge of growing, unfolding humans, are not altogether wicked in this base neglect of the rising generation. But they are in the prison-house of ignorance of the laws of being, to which they would gladly yield ready and willing obedience, were they once made certain of their imperative demands.

Now, how shall they become aware of the great necessity of this strict obedience, if those professing to be well acquainted therewith give no better evidence than is usual in the management of their own families? It seems as if dentists had taken the cue of the empirics of the medical fraternity, and especially eschewed their own remedies, for themselves and families.

For, truth to say, the families of most of those who acknowledge and call themselves dentists, are a standing testimony against them as to integrity, knowledge, or skill. The highest vocation of the diplomatist is to avoid collisions of interests between his constituency and the court to which he may be accredited, rather than the masterly adjustment of these when once fairly inaugurated. So also the most useful exercise of the knowledge of organization, integrating and disintegrating forces, is in anticipating and heading them off by an intelligent and prompt prophylaxis, rather than a wonderful display of antidotal power, after the aberration has declared itself to the ordinary unlearned apprehension and fear of the ignorant masses whose service for their good is the especial business of the divine physician, surgeon, and nurse, all of which functions in some sort devolve upon him who would properly care for the teeth of children as an honest, good and true philosophical Christian dentist. Children's teeth, like sick persons, seldom come under the observation of him who is to remedy and preserve them, till after they are so far gone as to have directed particular attention to them by pain or such mutilation as to render them unfit for at least present use.

And, as this is lamentably true, all we can do is take up the case as we find it, and not stand hesitating and regretting that we had not been called upon sooner. Whenever by the circumstances of pain, fracture, inconvenience, or what not, you get your eye upon the mouth of a child, give it a careful and thorough examination, and see to it that it be not neglected in any single little spot, where the disintegrating process has set up an action in ever so slight degree, and use your very best and highest power to first restore to the best state of health possible, all diseased teeth or parts of teeth, and then establish a strict regime of cleanliness to prevent further progress of the aberrant forces.

Teeth to be healthy *must be used*, and this holds forcibly good in the ratio of their frailty; hence, the diciduous teeth require more prompt and earnest attention than the denser adult set, although even these will soon fail, if not kept in vigorous use.

Knowing these facts and principles ourselves, happy are we if we act promptly in accordance therewith.

As to the best methods to pursue in filling children's teeth, the first prerequisite is to gain the confidence of the child and put it at ease in our presence. Prepare the teeth by allaying all tenderness in them by prompt and daily dressings of the tender cavities, in cases where this can be done, and where it cannot be done, insert soft and easily introduced fillings, such as Hill's stopping, or nicely-washed and carefully-packed amalgam fillings, somewhat after the Townsend recipe, to allow of being readily cut out when tenderness shall have been overcome, so we may properly excavate and replace with a new filling.

I hear it often objected that filling children's teeth does not "pay." To those who half kill the poor child by hasty and unskillful work, rushed through at railroad speed, without even an attempt at preparation, I have no doubt that it is true to patient and operator, that it does not pay. But when we take the interest and pains in convincing parents of the great advantage to the permanent teeth there is in giving full play to the deciduous set by keeping them in the jaws by all means until the teeth of replacement are fully ready to take their places, it does pay all the parties, especially the dear coming citizens of the world, who thus are made the happy possessors of a set of masticators which will need but little interference of the dentist, further than an occasional look at them to see that they are all right. It is not the fault of the patients that we are not appreciated and paid for our work. For, whenever a man truly fulfills his professional duties for the sake of the good he can do, more than the money he may get, his time becomes in demand at paying rates of both appreciation and cash.

Let each begin to do right up to his highest apprehension of his duty, and not wait to be pushed or pulled into line by a set of patients who do not know what their own needs are. As surely as we do this at every step of our career, we will have no cause to complain, so long as God is just.

DENTISTRY AS A PROFESSION.

BY WILLIAM CAHOON, D.D.S.

Read before the Michigan Dental Association, Detroit, Mich., January 7th, 1862.

DENTISTRY, as an art, can be traced back almost as far as medicine, but was rude and unsatisfactory until the beginning of the eighteenth century, when the smouldering embers were uncovered and a new impetus was given to the profession, and, like the damming up of a mighty river, when the flood-gates are opened, its torrents have nearly covered the civilized world; for, go where you will, there can be found the sign of the dentist, of all the varied styles, from the plain, simple notice of John Smith, Dentist, to the gaudy sign of S. Jones, Surgeon Dentist, where teeth are extracted without pain; and all these things have their significant meaning, and that is, that dentistry has become an institution among the other callings of the earth. The advancement that has been made in the science of dentistry within the last twenty years has been perfectly astonishing both to the profession and the public, for it is no unusual thing to hear the expression, What a change in dentistry since my time! even if the one who remarks this should only be middle aged, saying, Why, I can remember when human teeth and various other substitutes were used for teeth that looked so hideous and frightful, and were such poor apologies for teeth, that many were deterred from having them, even if they were abundantly able; for in those days the dentist had a good fee for his services, however poorly the teeth became the wearer. But things have changed now, artificial dentures can be so made as to deceive almost the dentist himself, and for purposes of mastication, to nearly deceive the wearer, for it is no unusual thing to hear from the wearers of artificial teeth, that they are glad their own teeth are out, and they are now taking some comfort in the world, which they never did while they retained their own natural teeth. I say again, all this means something, and that something is, that there has been greater advancement made in the science and profession of dentistry than in any of the professions. Therefore, let us say all honor to the minds that brought this profession of ours out of chaos, and who have labored unceasingly up to the present day to give to us a position and advantages that would have seemed, a few years ago, to have been a fable. But the end is not yet, for with the amount of talent and energy now developed, we may reasonably look for still greater things than we yet have seen.

As a profession, dentistry at the present day takes rank with the other professions, and that rightfully, for there is no calling that causes more anxiety to the lover of his profession than does dentistry; I care not how successful an operator he may be, he cannot divest himself of anxiety. It matters not how trivial the operation, and that is right; for when a dentist thinks he has arrived to a state of perfection in his profession, it might be truly said of him he is either an egotist or a madman, for the past history of dentistry proves conclusively that such a thing as perfection does not belong to this sphere; but as long as dentists feel the responsibility and the desire to investigate, and improve upon everything they undertake, then there will be progression steady and useful.

And in this communication we will take a view of dentistry in America, which stands pre-eminently ahead of all the rest of the world; for, go where you may through Europe, the American dentist is sought for; and many a foreigner who never saw America, claims, for his own pecuniary interest, to be an American dentist; and we that are assembled here in this convention, feeling as we do that as we have made choice of dentistry as our profession, and that it is one of the noblest of callings, may it be our highest aim in life to sustain unstained the high reputation American dentistry holds in the minds of the intelligent at home and abroad, by continuing to give ourselves up to the work with the same untiring energy and zeal that have characterized our predecessors, whose talents and energy we are now reaping the benefit of.

PLUGGING TEETH.

BY J. A. ROBINSON, D.D.S.

Read before the Michigan Dental Association, January 7th, 1862.

To say something on the subject of "plugging teeth" is comparatively easy; but to say something *new* is no small task. The three great requisites for a good operator are: care, time, and determination. Every theory in the world will fail without this "glorious trinity." First, care to have suitable instruments; second, care to thoroughly prepare a cavity; and, third, care for suitable material to make a good plug. If we have care without determination, we may not be thorough; and determination without care will often make us coarse and bungling; and if we have both these without time, we shall certainly fail.

Suitable instruments are indispensable in every vocation to a good result. A hook and a poke will not always answer the purpose. Cunning fingers will avail nothing without industry; and great intellects will fail without energy. Supposing we all have these requisites in a greater or less degree, we proceed to our work. A hatchet-shaped excavator, nicely tempered and sharp, is best for general purposes in ordinary cavities: the necessities of the case will always commend a different shape. So a plugger, bent to an angle of 35 degrees, and wedge shaped, with *graver point*, is best for soft foil; while, for crystal or adhesive foil, a serrated point is indispensable. By graver point, I mean a four-square plugger, wedge shaped, finished on an oil-stone on the four sides and the end to a *cutting edge*, so that it will not slip and cut the gold, but carry it forward to its place and pack it.

Since the introduction of crystal foil, we have almost invariably packed the walls of the cavity with soft foil, and filled the centre with crystal. Perhaps this practice might be called "eclectic," as we certainly believe soft foil is better for the walls of a cavity, while for solidity and fineness of finish crystal foil is preferable.

Three sizes for pluggers are almost indispensable; the largest, about No. 24 in the wire plate; the second, about No. 30; and the smallest, 36. These pluggers must be duplicated with three others, with serrated points—to be tempered spring temper—and sharpened, to a cutting edge, on an oil-stone.

I mention these things, because it is always necessary to have first-class instruments or tools to do first-class operations. I do not want any better evidence of a good dentist than to see his instruments.

The next requisite in *approximal cavities*, is sufficient space between the teeth. This can be accomplished with a chisel or file. I repeat, *earnestly*, separate well between the teeth; cleanse the cavity well with a sharp excavator, trimming the edges until they are strong enough to stand pressure, and make them smooth and even; for no filling, however thoroughly good, will satisfy the eye of a good dentist, without the junction of the gold is against a smooth edge of the cavity. To make it certain, we finish with a fine file before plugging. I cannot speak in too strong terms of a "tongue holder," for it is useless to try to weld crystal foil under water, or where it is damp and wet.

Now commence to pack the gold nearest the gum, and at that part of the tooth most difficult to get at when it is finished leave the pellets standing upright as nearly as possible, and beyond the edge of the cavity, to compress and finish, always retaining a good square cavity, growing smaller and smaller till the plug is completed. We intend to fill the entire walls of the cavity with soft foil, and about two-thirds full; fill the balance with crystal foil, and, with a fine serrated point, go over the whole surface perfecting any defects, and your tooth is saved. Perhaps it will be expected of me to speak of the various methods of preparing the gold before introducing it into the tooth. Much time and many arguments have been spent in discussing the merits of cylinders and ribbons, and of using the "*mallet*" in tooth plugging; and we confess that we have been more than once delighted while examining the teeth most perfectly filled in various ways, all producing good results in a very different manner. Still, we go back with joy to the old New England plan, the "Harwood" method, of crimping Abbey's No. 4 foil into a simple pellet, and doubling it in the middle to keep every edge in, and say, that if we can have only *one*, that is *best;* but the improvement to that is crystal centre, or, welding the surface to give it a more beautiful finish, in less time and with less labor.

Another, and perhaps no less important requisite in plugging teeth, is a *reasonable compensation.* This world is full of equivalents, and no man can invariably do well without remuneration. We cannot extricate ourselves from ourselves, and must go down or up with our prices. If a dentist knows he can get an equivalent for his work he will try and be thorough, but never without. There are but very few but would prefer to be *honest*, if they could get pay for it; but in this age, when the American mind asks what will do, instead of what is best, dentists, like the rest of humanity, *fail* and fall.

As the subject assigned me was "filling teeth," and nothing more, I will not trespass on themes to be treated by my brothers, but respectfully submit these remarks for your consideration.

THE VALUE OF STATISTICAL INFORMATION TO THE DENTIST.

BY JNO. C. K. CROOKS, M.D.

HAS it never occurred to the scientific dentist, who is laboring for the best results in his operations, of how much value an abundant statistical knowledge would be to him, as an elucidation of the subjects he may be pursuing? Cases from his own storehouse may be ever so perfectly at his command, yet his good judgment at once warns him of the utter fallaciousness of limited statistics. *Accuracy*, he knows, can only be obtained by the collection of a large number of facts bearing upon the point in question. In matters so various and complicated as those connected with vitality, in relation to which "nothing is little," all the observations of all the profession are required. Take, for instance, that much-mooted question, "fang filling," "filling of the nerve cavity," and of how much consequence would be the history of a thousand cases of each method of operating, with the percentage of successes and failures expressed mathematically! And if one thousand such cases would be of so much value, how much more would be the importance of ten or twenty thousand—the *certainty* of the deductions becoming more and more trustworthy, till, so far as any *practical* value is concerned, the subject might be forever put to rest, or until some new discovery should open the investigation afresh, when old facts would be as available as ever! If, then, when *doubt* obscures the way, (and we long for something more reliable than our present resources furnish us,) statistical information looks so like a deliverance, why can we not, like rational men, begin a system of registration, which, though it may not *immediately* bring the looked-for good, may one day avail us something, or at least produce a record that shall enlighten those who may come after, and teach them that labor of patience which always brings about great results?

Were there ten thousand dentists in our country, and one in ten only were willing to enter into the spirit of a *system* of *registration*, we should have one thousand every day doing something of more or less value to the profession. If they saw but four cases a day, four thousand *facts* would be daily placed in a tangible shape ready for future use. Every night each one of these registrars could have the satisfactory reflection, that he had availed himself of the occurrences of the day to contribute his share of materials, which, by careful generalization, might result in the formation of principles approximating to *certainty.*

Considering the rapid strides dentistry has made in the last twenty years, is it not now time for theorizing and speculation to cease? We have had to do with first principles—we have been "fed milk" long enough; let us now make a trial of "strong meat," and discover if the profession and the public are not prepared for it. We can improve the science of dentistry, operative dentistry more particularly, only upon the inductive method and the collection of the greatest number of facts. To our State and National Associations must we look for the inauguration of this great measure—*great*, because of incalculable value to science and of vast importance in producing a uniformity of practice and a uniformity of results. Had we more uniformity in dental practice, a *standard* in operations, the *people themselves* would become informed upon the subject, and the quack would no longer find material so abundant upon which to palm off his jugglery. Statistics would give us this, and when a principle was once *established*, he who would dare to act otherwise than in harmony with such principle would be like the surgeon who, with all the facts before him, with past experience as his guide, would begin the treatment of an aneurism by thrusting a knife into the sac! To this condition of things, medicine owes most of her dignity. Take, as an illustration, the collection of facts bearing upon the different systems of practice, from time to time, in cases of *placenta prævia.* How the mortality to mother and child were again and again reduced by a more enlightened method of procedure, till facts elicited from thousands of cases have reduced uncertainty to certainty, so that he who *will not* inform himself concerning the present state of this branch of obstetrical science, tampers with human life, and may subject himself to the liability of a *criminal* prosecution.

What medicine *has* done, dentistry *can do!* Almost absolute certainty *can* be attained, and there need thus be no more groping in darkness. Give us the *facts*, and the deductions will immediately follow. For the facts, we must rely upon the individual members of an intelligent, enterprising, and scientific profession. We should then no longer be drones in the hive of professional usefulness, lazily sucking up the sweets deposited by the patient "workers" in our ranks. Here is a field ample in dimensions for all, and, unless *all labor*, there will necessarily be furnished but little or no harvest.

But statistical information in dentistry should not be confined alone to subjects directly connected with our *practice*. The *etiology* of the many diseases, to treat which it is the province of the dentist, yet dwells greatly in obscurity. Can nothing be done in this direction also by statistics? Cannot *conservative* dentistry here find a valuable support? Has medicine done nothing in the same department of inquiry? If she can work with success, certainly *dentistry* ought, for the ground is much more limited in extent, and just as susceptible of cultivation! These being facts well known to the profession, why speak longer of the value of statistical information to the dentist?

The importance of dental statistics being established, what plan shall be pursued in order to obtain the *material* for generalization? At present, we know of no better than that adopted by the New York State Medical Society, viz.: to furnish blanks, sufficient to make a monthly record of the cases occurring in one year's practice, to every member; these blanks to be carefully filled out with a history of the cases presented in the practice of each person so furnished, and returned at the close of the year to the secretary of the society, to be by him, aided by competent assistants, placed into such tabular form as, by a glance, the desired information may be obtained.

Having often, in our own practice, seen the necessity of some more reliable data than we at present possess, it has caused us to give utterance to the above. We trust some one, more competent than ourselves, will pursue the subject further.

BIRMINGHAM, MICHIGAN, February 4, 1862.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of February 11th, 1862, at eight o'clock.

President, Dr. Buckingham, in the Chair.

Present, Drs. Peirce, Flagg, McQuillen, Ellis, Suesserott, H. M. White, J. W. White, Fitch, Barker, and the class of students in attendance at the Dental College.

The President stated the subject for consideration to be

"THE COMPARATIVE ANATOMY OF THE TEETH."

Continued from last meeting.

Dr. Peirce said, in collecting information on the comparative anatomy of the teeth, one cannot help being impressed with the important part the organs subserving nutrition have played in the classification of animals. It was said of Cuvier that he could instantly determine the character of any animal, its habits, food, structure of the stomach, form of the limbs, etc., by being furnished with a set of the teeth; and in this way the nature of many fossil animals have been determined.

The student of natural history is much indebted to Cuvier for his classification and arrangement. He said that animals were united in their most comprehensive groups, not on external characteristics, but on different plans of structure. Of such plans or structural conceptions, Cuvier found in the whole animal kingdom only four, which he called *vertebrates*, *mollusks*, *articulates*, and *radiates*. He also divided these four divisions into nineteen classes, and these again into seventy-seven orders. In his classification and subdivision he depends much upon the organs subserving nutrition.

Following the precedent established at the last meeting, he should ask attention for a few moments to the modifications of those preparatory digestive organs in the order which are more strictly limited to one kind of food, namely, the *Carnivora*—an order of mammals which feed upon flesh, as the name indicated. This order has been divided into various groups by different authors, some including in it the *cheiroptera* and *insectivora*, and others limiting it to the five following families, which agree in their most essential characters, viz.: *ursidæ*, or bears; *mustelidæ*, or weasels; *canidæ*, or dogs; *felidæ*, or cats; *phocidæ*, or seals; the bears constituting the plantigrades, the seals, the pinnigrades, and the other three the digitigrades, according as the whole foot or only the toes touch the ground, or as the extremities are modified into fin-like paddles. The felidæ, or cats, are the most truly carnivorous, and constitute the type of the order. In them the large canine teeth, sharp, retractile claws, and great strength and agility indicate a special formation for the pursuit and destruction of living prey. The skeleton exhibits the modifications adapted for the manner of life, in the shape of the bones, their articulations and proportions. The teeth of the carnivora present a higher grade of development than those of any of the mixed or insect-feeders. In their relation to nutrition their operations are more extensive and important, being adapted not only to comminute the food, but to obtain, kill, and, when killed, separate the nutritious from the inedible parts; not that they are the most complex teeth, for those must be sought for in the herbivorous.

The dental arrangement consists of four large and long canine teeth, which are separated in each jaw by six incisors, the centrals being the smallest; the molars offer a variety, both in number and kind, there being various degrees of deviation from the dentition of the typical carnivora, as exemplified in the cat—the formula of which is, incisors, $\frac{6}{6}$; canines, $\frac{2}{2}$; premolars and molars, $\frac{6}{4}$.

In the entire group we find the four canines; the only deviation from the twelve incisors is found in some of the seals where they are fewer in number. Cuvier divides the molars of the carnivora into three kinds—the false or premolars, carnivorous, and tuberculous; those which have the teeth either entirely or partially tuberculous, feed to a greater or less extent on vegetable matter. In proportion to the sharpness of the teeth, we may decide whether or not they are exclusively carnivorous; in such the molars closing upon each other like the blades of a pair of scissors.

In composition and microscopical structure the teeth of the carnivora so closely correspond, both with each other and with those of the bimania or human, as to require but a brief notice. They all enter into the category of simple teeth—that is, the dentine or main body is not penetrated by folds of the other component tissues, (as are the ruminants,) but has an even exterior, covered, on the part forming the crown, with enamel, having a general investment of cement; the coronal layer being very thin; the dentinal tubuli smaller than those in human teeth; having the same general direction from pulp cavity, but with more decided primary curves. In the seals the dentine forms a smaller proportion of the teeth—the characteristic thickness of their fangs is due to cement; diameter of tubes, $\frac{1}{12000}$ of an inch; diameter of interspaces, $\frac{1}{8000}$ of an inch. The enamel of the teeth of the carnivora is extremely dense and brittle, and consists of fibres similar to those of human teeth, but relatively smaller. In all the species belonging to this order, the articulation or condyloid process of the lower jaw is semicylindric and transversely placed, corresponding so precisely with the glenoid cavity of temporal bone that it can only be moved in one direction, or is incapable of any motion save the vertical or opening and shutting.

The zygomatic arches are very large, and the skull, especially at the posterior part, is much compressed, which gives the space requisite for the large and powerful muscles concerned in the act of mastication.

The orbit of the eye is not separated from the temporal fossa by bone.

The carnivora, in proportion to their approach to the typical felidæ, whose food, when swallowed, is so like their own tissues that it is ready for speedy assimilation, have a short intestinal canal. In the lion, it is but three times the length of the body, and has very few internal folds; while in man it is five times as long; in the horse, ten times; in the sheep, twenty-eight times. Such is the relation between the organs, that the form of the teeth indicates the character of the intestinal canal, the armature of the feet, the mode of progression, and very nearly the habits and mode of life of an animal.

The geographical distribution of the carnivora is very extensive, but the largest and most distinctive species are confined to the tropics of the Old World—the tiger is limited to Asia; the lion, to Asia and Africa; the cougar, to America; the largest bears frequent the Arctic regions;

and the largest seals, the Antarctic waters. The carnivora fulfill an important purpose in the economy of nature, by keeping in check the increase of the herbivorous animals, whose countless numbers would otherwise destroy vegetation, and thus cause their own and a general destruction.

Dr. Ellis said, a few more words in relation to the order which had formed the subject of Dr. Peirce's remarks, viz., Carnivora, might not be inappropriate. He desired, however, to confine his observations more particularly to the genus *felis*, as being the most characteristic of that order, selecting the Cat as the typical animal.

In noticing the head of this animal, we find that the jaw, by the peculiar articulation, is limited almost entirely to the vertical motion; the zygomatic arches are wide and deep, the occipital and sagittal crests are high, and the jaws are short and strong, all of which features would indicate it as a member of the formidable and destructive order carnivora. As had been stated, in the order carnivora the incisors are six, above and below, seldom falling short of and never exceeding that number; the canines are always found large and well developed, numbering two in each jaw; the principal variation occurs in the molars—directly the reverse of the Insectivora, where the greatest diversity exists in the incisors and canines. The cat is at first provided with deciduous or temporary teeth, which at a certain age are shed, and, as in man, are replaced by a second or permanent set. There is, however, a striking peculiarity in regard to the number of teeth in both the temporary and permanent set of this animal, for, unlike man, where the complement of these organs in the two jaws is alike, in the cat the teeth of the upper outnumber those of the lower jaw by two. The temporary set of the cat consists of twenty-six teeth — fourteen to the upper jaw and twelve to the lower, as follows: incisors, $\frac{3-3}{3-3}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{3-3}{2-2} = 26$. The incisors are the first teeth erupted, and appear between the ages of two and three weeks; these are followed by the canines, and lastly, the molars are presented, all occupying their places before the termination of the sixth week. The shedding of these teeth commences after the seventh month, and they are lost in the same order in which they appeared, the last lower molar (permanent) being above the gum before any of the temporary molars are displaced. The permanent set of the cat consists of thirty teeth, the number of incisors and canines being the same as in the temporary, but there are four additional molars, which, from the fact of having had no antecedents, are termed true molars.

He would describe the permanent teeth, commencing with the incisors, which are divided into three pairs, the middle ones being termed the *centrals*, the two adjoining ones the *lesser*, and the last on each side the *lateral* incisors; they are small, single-rooted teeth, having their crowns in a transverse line, and are smaller in the lower than in the upper jaw.

The canines are large, their crowns long, sharp pointed, and conical, convex anteriorly, but less so posteriorly, and often quite flat, and in closing those of the lower interlock in front of those of the upper jaw. These teeth are marked with two longitudinal grooves, which is typical of the felidæ. We come next in order to the molars; but before separate description, he would state that in most carnivora there is one molar on each side, which is so constructed as to close upon the antagonizing tooth like the blades of scissors, and has, in consequence of this peculiar formation, received a distinct name—it is termed by Professor Owen "Dens Sectorius," or scissor-like tooth, while Cuvier gives it the name of "Dens Carnassière." The first and last molars in the upper jaw are small, single-rooted teeth, but the second molar is much larger, being provided with two strong, diverging fangs and a sub-compressed conical crown; the third molar of this jaw is the sectorial tooth; and in the felidæ has three fangs, two being anterior and one posterior; the crown or blade consists of three lobes formed by two deep angular notches; the first two of the lobes are conical, the third, however, is the largest, and in all purely flesh-eating carnivora has its point directed backward. In the lower jaw the first two molars are somewhat similar in form, both having two roots, the second, however, being the larger; the third molar in this jaw is the sectorial tooth, and is a true molar; it has two fangs, the anterior one being much the larger; the crown consists of two very sharp-pointed lobes, and in bringing the jaws together, closes outside, and a little in advance of the upper sectorial. In the carnivora the dentine is of the "hard or unvascular" variety, and microscopical investigation has shown that the tubuli pursue the same direction as in the human tooth, but they are rather smaller, more marked in their primary curvatures, and possess more numerous minute lateral branches. The enamel is exceedingly dense and brittle, the fibres being similar to those of the human tooth, though relatively smaller; the cementum is continued over the crown, but in a film so thin that we fail to detect the radiated cells.

He would say in conclusion, that his own investigations in relation to this subject had proven but confirmatory of what had already been presented in the works of Rosseau, Agassiz, Owen, and others, in this direction.

Dr. Barker said, he had chosen for consideration a class known as *Mammalia*, of the order *pachydermata*, and genus *proboscidean.*

Several gentlemen present would remember that at the last meeting he took up the extinct animals of this class, order, and genus, namely, the Mastodon, but now proposed to call attention to the surviving species of this family, namely, the Elephant.

Of this genus but two species remain—the one inhabiting certain parts of Africa, the other of India.

The Indian elephant has an oblong head, concave forehead, with ears smaller than the other, and has four nails on the hind feet. It inhabits from the Indies to the Eastern Sea, and in the large islands to the south of India.

The African species has a round head, convex forehead, large ears, and by Cuvier is thought to have only three nails to the hind feet. They inhabit from Senegal to the Cape, and, hitherto, have resisted all efforts in the way of domestication, though it appears that the Carthaginians employed them for the same purposes as the Indians do theirs.

The period of gestation is twenty months; the new-born elephant is about three feet long, and all its senses are perfect; it sucks with the mouth, and not with the proboscis, turning the latter back in that operation. Lactation continues nearly two years, and between fifteen and twenty years old they may be said to be adult. Though they have a great affection for their young, it is understood that these suck indifferently all the females in the herd to which they belong. They are gregarious, in herds of about one hundred, and inhabit the humid forests, and vicinity of rivers, in which they swim with great ease, sometimes having no part above the surface of the water but the end of the proboscis, through which they respire.

The dentition of the elephant consists of two long tusks developed in each of the intermaxillary bones, (while in the mastodon we find there was also two tusks in the lower jaw,) and large and complex molars in both jaws — of the molars there is never more than one wholly, or two partially, in place and in use on each side at any given time; for, like the molars of the mastodon, the series is continually in progress of *formation* and *destruction*, of shedding and replacement.

In the elephant all the grinders succeed one another like true molars from behind forward, none being displaced by vertical successors or premolars.

The total number of teeth developed in the elephant is represented by the following figures: incisors, $\frac{2-2}{0-0}$; molars, $\frac{6-6}{6-6} = 28$.

The deciduous tusk makes its appearance beyond the gum, about the fifth or seventh month; it does not exceed two inches in length, and is about one-third of an inch in diameter at its thickest part where it protrudes from the socket; the fang is solidified, and contracts to its termination, which is commonly a little bent, and is considerably absorbed by the time the tooth is shed, which takes place between the first and second year.

The permanent tusk cuts the gum when about an inch in length, a month or two after the milk tusks are shed; they are at first black and ragged at their ends, but when they become long, and project beyond the lips, they are worn smooth by the friction and motion of the trunk.

The tusk, conical at its first-formed part, afterward subcylindrical, being subjected to no habitual attrition from an opposing tooth, and worn only by the occasional uses to which it is applied, arrives at an extraordinary length; and, indeed, these teeth not only surpass all other teeth in size, as belonging to an animal so enormous, but they are the largest of all teeth in proportion to the size of the body, representing in a natural state those monstrous incisors of the rodentia, which are the result of the accidental loss and suppression of the wearing force of the antagonizing teeth.

The tusks of the elephant, like those of the mastodon, consist chiefly of that modification of dentine which is termed ivory, and he should presently show in what manner it differed from the first-named structure.

In the female Indian elephant the tusks are always short and straight, and are also less deeply implanted than in the male. In the male they have been known to acquire a length of nine feet, with a basal diameter of eight inches, and to weigh one hundred and fifty pounds.

Anomalous varieties occasionally present themselves in the Indian elephant, as when one tusk is horizontal and the other is vertical, or when from some distortion of the alveolus a spiral direction is impressed upon the growth of the tusk.

The molar teeth of the elephant are remarkable for their great size, even in relation to the bulk of the animal, and for the extreme complexity of their structure, and he was pleased to present a very perfect one to their notice, it having been loaned to him by his friend, Dr. J. D. White. But little more than the grinding surface appears above the gum, the crown being to a great extent buried in the socket. The grinding surface is deeply divided into a number of transverse perpendicular plates, each consisting of a body of dentine coated by a layer of enamel, and this by a dense substance called cement which binds together the several divisions of the crown.

The growth of each plate begins at its summit, and they remain detached like so many separate teeth until the base is completed, when they become blended to form the common body of the crown of the complex tooth, from which the roots are next developed. The formation of each grinder begins at the summit of the anterior plate, and the rest are completed in succession; the tooth is gradually advanced in position as its growth proceeds, and in the existing Indian elephant the anterior plates are brought into use before the posterior ones are formed.

When the complex molar cuts the gum, the cement is first rubbed off the digital summits, then the enamel cap is worn away and the central dentine comes into play with a prominent enamel ring.

The digital processes are next ground down to their common uniting base, and a transverse tract of dentine, with its wavy border of enamel, is exposed; finally, the transverse plates themselves are abraded to their common base of dentine, and a smooth and polished tract of that substance is produced. From this basis the roots of the molar are developed, and increase in length to keep the worn crown on the grinding level until the reproductive forces are exhausted. When the whole extent of a grinder has thus successively come into play, the last part is reduced to a long fang supporting a smooth and polished field of dentine, with sometimes a few remnants of the bottom of the enamel folds at the posterior part.

When the molar has been reduced to a uniform surface it becomes useless as an instrument for grinding the coarse vegetable substances on which the animal subsists; it is then attacked by the absorbent action by which; and the pressure of the succeeding teeth, it is finally shed.

The grinding teeth of the elephant progressively increase in size, and in the number of lamellar divisions, from the first to the last, the rate of increase in both respects being identical in both jaws.

The first molar cuts the gum in the course of the second week after birth, at the end of three months is in place and in full use, and is shed when the animal is about two years old. Each molar tooth differs in the number of transverse plates. Thus, the

First molar has	4
Second “ “	8 or 9
Third “ “	11 to 13
Fourth “ “	15 “ 17
Fifth “ “	17 “ 20
Sixth “ “	22 “ 27

As the process of shedding and replacement is identical, he would only call attention to the fact that the sixth molars generally present when the animal is about fifty years of age, and they must necessarily last him during his lifetime, the average duration of which is a century; but in consequence of the fact that every part of the body of the tooth must become a grinding surface, they are enabled to perform their requisite functions until the death of the animal occurs.

The molar teeth in all the species of elephant succeed each other from behind forward, moving not in a right line, but in the arc of a circle; the position of the growing tooth in the closed alveolus is almost at right angles with that of the molar in use, the grinding surface being at first directed backward in the upper jaw, and forward in the lower, and is brought by the revolving course into a horizontal line in both jaws, so that they oppose each other when developed for use.

The bony partition between the tooth in use and its successor is perforated near the middle; and in its progress forward, that part next the grinding surface is first absorbed, the rest disappearing with the absorption of the root of the preceding grinder.

There are few examples of organs that manifest more strikingly the adaptation of a highly complex and beautiful structure to the exigencies of the animal endowed with it. We perceive, for example, that the jaw is not encumbered with the whole weight of a massive tooth at once, but that it is formed by degrees as it is required; the subdivision of the crown into a number of successive plates, of these into subcylindrical processes, presenting the conditions most favorable to progressive formation.

But a more important advantage is gained by the subdivision of the tooth, each part being formed like a perfectly simple tooth, with a body of dentine, a coat of enamel, and an outer investment of cement. A single digital process may be compared to a simple canine of a carnivora;

a transverse row of these, when the work of mastication has commenced, presents, by virtue of the different density of their constituent substances, a series of cylindrical ridges of enamel, with as many depressions of dentine and deep external valleys of cement. The more advanced and more abraded part of the crown is traversed by the transverse ridges of the enamel inclosing the depressed tracts of the dentine, and separated by the enamel from the deeper channels of the cement.

The fore part of the tooth exhibits its least efficient condition for mastication, the inequalities of the grinding surface being reduced in proportion as the enamel and cement which invested the dentinal plates have been worn away.

This part of the tooth is, however, well fitted for the first coarse crushing of the branches of a tree; the transverse enamel ridges of the succeeding part of the tooth divide the vegetable food into smaller fragments, and the posterior islands and tubercles of enamel pound it to a mass fit for deglutition.

The structure and progressive development of the tooth not only give to the elephant's grinder the advantage of the uneven surface which adapts the millstone for its office, but at the same time secure the constant presence of the most efficient arrangement for the finer comminution of the food at that part of the mouth nearest the fauces.

When we examine the tusk of the elephant microscopically, we find the dentinal tubes are exceedingly minute, being but the $\frac{1}{15000}$ of an inch in diameter at their origin from the pulp cavity; they also present a wavy appearance somewhat analogous to the secondary curvatures in the dentinal tubes of ordinary teeth.

Musket-balls and other foreign bodies which are occasionally found in ivory are, immediately on their introduction, surrounded by *osteo-dentine* in greater or less quantity.

It has long ceased to be a matter of wonder how such bodies should become completely imbedded in the substance of the tusk, sometimes without any visible aperture, or how a leaden bullet may have become lodged in the solid centre of a very large tusk. Such a ball, having been aimed at the head of an elephant, may penetrate the thin, bony socket and the thinner ivory parietes of the wide, conical pulp cavity occupying the inserted base of the tusk; if the projectile force be then spent, the ball gravitates to the opposite and lower side of the pulp cavity.

The presence of the foreign body exciting inflammation of the pulp, an irregular course of calcification ensues, which results in the deposition around the ball of a certain thickness of osteo-dentine, (at least eminent odontographers assert such is the nature of the substance.) The pulp, then returning to its healthy state and function, coats the surface of the inclosing mass of osteo-dentine, together with the rest of the conical cavity into which that mass projects, with layers of normal ivory.

Should the ball have penetrated the base of the tusk of a young elephant, it would be carried forward by the uninterrupted growth of the tusk until that base has become the apex, and at last be exposed and discharged by the continual abrasion to which the apex of the tusk is subjected.

Before passing from this interesting genus, it seems appropriate to speak of the uses and formation of the proboscis, and from which the genus takes its name. In the formation of this admirable member it has not been necessary to deviate from the ordinary laws of development by the creation of a new organ, the same end being accomplished by the extension of a structure already belonging to the type of mammiferous animals. In several of the pachydermata the nostrils are considerably advanced, so so as to form a movable snout; this is observable in a certain degree in the hog; it is still more remarkably seen in the tapir, which has a snout so lengthened and so movable as very much to resemble, though on a small scale, the proboscis of the elephant. This latter organ, then, must be considered as merely an elongation of the nostrils, which have been drawn out to suit a special purpose, very different from the function to which that part is usually subservient.

The elephant uses its proboscis as an organ for seizing, feeling, and respiration, but not of smell. With this it can hold a pole or branch, and strike with tremendous violence, and with this conveys both food and water to the mouth. The nasal apertures are not prolonged beyond the bones of the nose, and do not pass through the proboscis, and the lower lip has a very little motion.

The shortness of its neck not permitting the animal to lower the mouth to the ground to pasture, it collects the grass and leaves of trees with its proboscis. When it eats, the muscles of the cheeks seem, by a sort of spontaneous action, to push the food between the teeth for trituration.

The proboscis anatomically consists of a cylinder perfectly flexible, and of a length sufficient to reach the ground when the elephant is standing. The animal has the power of moving it in all directions by means of a prodigious number of muscular fibres, which are collected in small bands, some passing transversely, and radiating from the interior toward the circumference, others situated obliquely, and a third set running longitudinally, and forming an exterior layer; but they are all variously interlaced together, so as to form a very complicated arrangement.

The extremity of the proboscis, which is endowed with great sensibility, is furnished with an appendix resembling a finger, most of the functions of which, indeed, it is capable of performing.

While fleetness and elasticity are the results of the mechanical conformtion of the horse, solidity and strength are the objects chiefly aimed at in the construction of the elephant. The limbs have a great weight to sustain, in consequence of the huge size of the body, and are shaped into four massive columns, of which the several bones are disposed nearly in perpendicular lines.

By this means the body is supported with scarcely any muscular effort, and the attitude of standing is in this animal a state of such complete repose that it often sleeps in that position.

The number of the toes, instead of being reduced, as in the horse, to one, or two, as in the ruminants, is here increased to five, though, in consequence of their being very short, and of the skin which covers them being very thick, they hardly appear externally, and are distinctly recognized only in the skeleton.

Dr. McQuillen remarked that he had been deeply interested in the paper just read; and as it was somewhat difficult for the mind to pass at once from the consideration of a subject in which it has been very much absorbed to another possessing widely different characteristics, he trusted that due allowance would be made for any shortcomings in his presentation of the *order* of animals, to which the attention of the Association was now invited.

This *order* was the *Ruminantia*, so named on account of the singular faculty possessed by every member of the *order*, of returning the food to the mouth and subjecting it to remastication after it has been once swallowed.

Of all animals, the ruminants are the most useful to man, furnishing him with nearly all the flesh he consumes, with milk, tallow, leather, horns, etc., and some serving as beasts of burden. The different genera of this *order* are quite numerous, the most important being the camels, musks, oxen, sheep, goats, antelopes, and stags, which are again divided into several *species.*

Prior to directing attention to the dental arrangement of this order, it would not be amiss to glance briefly at the marked difference between the skulls of the *carnivora* and the *ruminantia.* Selecting the Polar Bear and the Ox as types of each *order*, it is found, in addition to the peculiar articulation of the lower jaw with the upper, to which attention had been directed on a former occasion, that in the Polar bear the *temporal fossæ* are very wide and deep, and thus afford an extensive *origin* to immense *temporal muscles*, which are inserted in the *coronoid process* of the inferior maxilla; that the *zygomatic processes* are very strong and prominent, and the *masseter muscles*, which *arise* from them and are inserted in the external surface of the *rami* and body of the lower jaw, are very large and powerful; while the *pterygo-maxillary* and *pterygoid fossæ*, giving origin respectively to the *external* and *internal pterygoid muscles*, are, comparatively speaking, quite shallow, and the muscles small.

The necessity for powerful elevator muscles, the temporal and masseter, is apparent when bearing in remembrance that this animal is frequently compelled to seize and hold on to very strong prey; while the absence of all lateral motion on the part of the lower jaw accounted for the small size of the pterygoid muscles.

In the *ox* and all the ruminant animals, on the other hand, the *temporal* *fossæ* are quite narrow and shallow, the *zygomatic processes* not very prominent, and the *temporal* and *masseter* muscles arising from them are feeble in comparison with those of the animal just referred to. The *pterygo-maxillary* and *pterygoid fossæ*, however, are quite deep, and the *external* and *internal pterygoid muscles* arising therefrom largely developed.

Bountifully provided as the members of this *order* are, by nature, with a rich repast spread at their feet wherever the earth is clothed with vegetation, and which requires little or no exertion to devour, there is no occasion for powerful elevator muscles; but the necessity of remasticating the food after a first deglutition demands that the muscles concerned in the horizontal motions of the inferior maxilla, backward and forward and from side to side, should be adequate to that duty; and such is found to be the case.

There is another marked peculiarity presented in the crania of the ruminantia worthy of attention, which is not found in any other *order* of animals, and is absent in at least two of the genera of this order —the *camels* and *musks;* it is the presence of *two horns* attached to prominences of the frontal bone. As these horns differ very much in their structure, some being hollow, and others solid, the different animals possessing them have been collectively designated hollow-horned and solid-horned ruminants—the *ox*, *sheep*, *goat*, and *antelope* coming under the first head; while the second embraces the various species of *stags*—the elk, moose, reindeer, deer, etc.

In the hollow-horned variety, the prominences of the frontal bones, which are hollow, and communicate with the frontal sinus, form the core or support of the elastic sheath to which the term *horn* has been applied. These are never shed, and differ very much in that respect from the *solid-horned* ruminants who annually shed and renew their *antlers*, which frequently, as in the case of the elk, acquired an immense size, and weigh from thirty to forty pounds. These *antlers* are supported on short and solid tubercles of the frontal bone, and are decidedly osseous in their structure, presenting, when a thin section is placed in the field of the microscope, the *Haversian canals*, *lacunæ*, and *canaliculi* observed in bone. The separation of the antlers from the bone is on the same principle as the atrophy of the roots, and exuviation or shedding of the crowns of the deciduous teeth, viz., by molecular disintegration at the base.

Passing now to the dental organs of the *ruminantia*, the marked peculiarity presented in that direction by the majority of this order is the absence of incisors and canines in the upper jaw—the principal exception to this being in the camels and musks, the first of which possess a pair of laniariform incisors, and quite formidable canines in the upper jaw; while in the latter the canines are so long that they project beyond the lips a considerable distance, as tusks, and are said to be used very freely by the animal as weapons of offense and defense.

The ordinary formula of the permanent teeth of the ruminantia, as presented by Owen, is in the upper and lower jaw—incisors, $\frac{0-0}{3-3}$; canines, $\frac{0-0}{1-1}$; premolars, $\frac{3-3}{3-3}$; molars, $\frac{3-3}{3-3} = 32$.

As already stated in the formula presented, the incisors of the lower jaw are six in number, and in the ox and sheep their crowns have a spatulate or leaf-like shape, each tooth being very much constricted at the neck, and then expanding in width as it passes up to the cutting edge. They are somewhat trenchant in their position, owing to the fact of diverging slightly from the alveoli, and in place of having incisors to antagonize with in the upper jaw, they are opposed by a thick pad of callous gum, and are thereby better prepared to crop the herbage on which the animal subsists. The canines differ so little in shape from incisors, particularly after the abrasion incident to use, that they have been classified by some observers as incisors, and under such circumstances the lower jaw described as possessing eight incisors, Cuvier even having been led astray in this respect. A casual examination of the teeth for a considerable period after *eruption* would, however, readily correct such erroneous conclusions. Between the canines and the molars there is quite a large vacant space or diastema. The division of the molars into premolars and true molars is due to the fact that the first have smaller and more simple crowns than either the deciduous molars, which they replace, or than the true molars situated posterior to them. The crowns of all the molars present two double crescents, the convexity of which is turned inward in the upper, and outward in the lower ones; in addition to this the triturating surface is found to present a series of inclined planes leading from prominent ridges to large, hollow cavities lying at their base—the inequalities thus presented being due to an unequal wear of the different tissues composing the crown.

The grass, either in the green or dry state, on which this order of animals subsist, containing as it does large quantities of pure silica or flint, produces a decided abrasion of the teeth, the molars particularly. If the teeth, although presenting a rough masticating surface when first erupted, had been composed of only one tissue, they would have soon worn smooth and proved inadequate to the service demanded. To meet this emergency, therefore, the different tissues composing the tooth—the enamel, dentine, and cementum—as in the case of the rodentia, are all arranged on the same plane. By such a contrivance the teeth necessarily wear unequally, and always present a rough, uneven grinding surface to the food.

In connection with this he would take occasion to say that after examining the teeth of several cows fed on the slops or grains obtained from breweries for a considerable period, he had been unable to discover that their teeth had either fallen out or become loosened in their sockets, as some observers have stated invariably supervenes when these animals are fed on that substance. Such was certainly not the case in the specimen presented—the skull of a cow which to his certain knowledge had been freely supplied with this article for years, Dr. McQuillen having boarded during the summer months with the farmer from whom the specimen was obtained.

Comparing that specimen with another procured from a friend whose farm is a considerable distance from the city, and whose cattle are fed on grass and ordinary fodder, the members present could see that there was little or no difference in the connection of the teeth with the jaws of each specimen, being as firmly implanted in the one as the other. He did not wish to be understood, however, as asserting that such results never supervene from the use of the article referred to, but that his limited observation had not confirmed the common impression on this point.

The interblending of the layers of enamel and cementum with the dentine is shown very clearly on placing a transverse section of the crown of a molar in the field of the microscope, employing for the purpose a lens of a low magnifying power. Under such circumstances, the *cementum* is found surrounding the tooth; within this, a layer of *enamel*, running irregularly around the margin of the tooth; next to this, *dentine;* then *cementum*, on the other side of which *dentine* again appears bounded by *enamel.*

The difference in the microscopical structure of these tissues from that of the same tissues in the teeth of the mammalia generally is very slight, a few vascular canals being present in the *dentine* of the *incisors*, and, also owing to the greater thickness of the *cementum*, in the *molars*, appearing in that tissue along with the characteristic *lacunæ* and *canaliculi.* The calcification of the pulp in old teeth, particularly in the molars, results in the formation of *osteo-dentine.*

Although in the *permanent* teeth of the majority of ruminants there are no incisors or canines in the upper jaw, owing to the fact that the cavicorn or hollow-horned variety have rudimentary superior incisors and canines imbedded in the gums, which were first observed by Goodsir in the embryos of the cow and sheep. Owen has presented the following formula as characteristic of the deciduous series:—

$$\text{In}\,\frac{3-3}{3-3}\qquad \text{C}\,\frac{1-1}{1-1}\qquad \text{M}\,\frac{4-4}{4-4} = 32$$

The incisors and canines in the upper jaw of the fœtal calf and lamb, however, never pass beyond the rudimentary stage; and the true formula of the deciduous teeth of these animals is as follows:—

$$\text{In}\,\frac{0-0}{3-3}\qquad \text{C}\,\frac{0-0}{1-1}\qquad \text{M}\,\frac{3-3}{3-3} = 20$$

Considerable interest has been attached to the change of dentition as indicative of the age of these valuable animals, but he was not prepared to say anything on that point.

Intimately connected with the teeth of the ruminantia, is the remarkable arrangement of the stomach, which, as in the specimen spread upon the table, the stomach of a cow, is found to be of immense size, and divided into four compartments or stomachs; the *first*, and largest stomach, being called the *paunch*, and slightly divided internally into four compartments; the *second* stomach, owing to the arrangement of the internal surface into irregular pentagonal cells, is named the *reticulum* or *honey-comb bag;* the *third* stomach, *omasium* or *manyphis*, having its parietes arranged in longitudinal laminæ, and covered with small granular papillæ; adjoining this, is the *fourth* stomach or *caillet*, next in size to the *paunch*, its sides presenting large longitudinal rugæ, covered with villi. The last is the true organ of digestion, and analogous to the simple stomach of animals in general. In connection with the different stomachs, the œsophagus can be observed, not merely opening into the paunch, but also having a gutter or canal passing into the second and third stomachs.

The large size and complex arrangement of the stomach is demanded, because the food of the animal has to be taken in immense quantities, as it contains a very small proportion of nutritious matter, and that not easy of assimilation.

When feeding, the coarse vegetation, after being slightly bruised by a first mastication, and swallowed by the animal, passes along the œsophagus to the *paunch*, and then, by small portions, to the second stomach, where, after being subjected to an elevated temperature for some time, and mixed with the secretions, the portions in the second stomach are compressed into little pellets, which successively ascend to the mouth to be rechewed. After this is thoroughly effected, the food is again swallowed, and passed on to the third stomach; a channel being formed through the first two by the contraction of the groove or gutter made by the prolongation of the œsophagus.

On comparing the complex stomach of the *ruminantia* with the same organ in the *carnivora*, the latter is found not only much smaller, but more simple in its construction, having but one cavity. This is due to the fact that the diet of the animal contains a large proportion of nutrient material to the bulk of food, which is easily assimilated; and it is, therefore, not necessary that it should be taken in very large quantities, or remain for a considerable period in the stomach.

It is said "that all flesh is grass," and, while there could be no question about the correctness of the assertion, or that the ox can live on grass, and the tiger live on the meat of the ox, it is also a fact universally recognized that each animal would starve to death on what would easily support and nourish the other. The solution of this singular fact is presented in the different arrangement of the digestive apparatus of each.

In conclusion, he said that the study of comparative anatomy and physiology tended to give one larger and broader views not only of the relation that man bears to the different orders of the animal kingdom, but also with regard to much that contributes to the health, comfort, and happiness of man. This was particularly the case with regard to food—and, on examining the teeth and stomach of man, they are found to occupy a position intermediate to those of the carnivorous and herbivorous animals. In his teeth are found the chisel-shaped *incisors* of the *rodentia*, the sharp-pointed *canines* and *bicuspids* or *premolars* of the *carnivora*, and the tuberculated *molars* of *granivora* and *herbivora*.

We have here presented the strongest evidence that man is truly *omnivorous*, and that his diet should consist of an admixture of animal and vegetable food. Taking this in connection with the fact that man presents the highest order of physical and mental development in those countries where the inhabitants unite animal with vegetable food, we have, laying aside others equally forcible, the most conclusive arguments in opposition to those who assert that the physical and moral evils by which mankind are afflicted, arise from the use of animal food, and on that account would restrict man to an exclusively vegetable diet, so as to restore his organism to the condition which they conceive it possessed when in the original state of native simplicity. The advocates of this system we find indulging in such rhapsodies as the following:—

"No flocks that range the valley free,
To slaughter I condemn;
Taught by that power that pities me,
I learn to pity them.

"But from the mountain's grassy side,
A guiltless feast I bring;
A scrip with herbs and fruits supplied,
And water from the spring."

Although these lines are liberally quoted by those who favor such a system, their author* neither advocated nor practiced such an absurd course; but, on the contrary, is represented to have been decidedly partial to a free indulgence in a generous diet. A few eminent men have earnestly advocated the exclusive adoption of a vegetarian diet, but they have evidently not taken that broad and comprehensive view of the subject which they should have done.

Dr. Fitch said, after listening to the elaborate and very interesting remarks from gentlemen preceding him, he was fearful, from the limited preparation which he had made, that he should not be able to make his remarks interesting, or do justice to his subject. The Whale, the animal which he wished to consider, had many points of interest, and it was impossible for him to say anything of its teeth, as the animal possesses none, at least that species to which he intended to direct attention. Its class is *mammalia*, order *cetacia*, and species *balænidæ*. There are two families of the order, the size of the head and body determining this division—

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* Dr. Goldsmith.

the *delphinidæ* or dolphin family, and the *balænidæ* or whale tribe. The first family will receive but a few passing remarks. They are quite ferocious, and are nearly allied to the carnivora in their nature and food. The most of them have teeth.

Chambers embraces in this tribe the dolphin, porpoise, grampus, white whale, bottle nose, norwhal, or sea unicorn, and a few others. The latter, he states, is remarkable for having a single tusk, which projects from the middle of the upper jaw, to the length of ten feet.

He wished to call particular attention to the second division, viz., the *balænidæ* or whale family. This tribe or genus has many species. The principal of which are the *balæna mysticetus*, or Greenland whale; the *balæna physalis*, or the great northern *rorqual;* and the *catodon*, or spermaceti whale. These species are very similar in structure, size, and habits. The *balæna catodon* or spermaceti whale has teeth in the lower jaw only, as its name indicates. It has enormous cavities in the head, filled with an oil known as spermaceti. These cavities are quite distinct from the brain cavity, which is situated in the posterior region of the cranium. The teeth are quite large in size and fit into cavities in the upper jaw when the mouth is closed, the jaws being from twenty to twenty-five feet long. He wished to notice more particularly the first division, the balæna mysticetus or Greenland whale. It may be considered, in many respects, a good type, and it is the largest animal known. Formerly, some differences of opinion existed as to its size, and it was variously stated to be from 60 to 250 feet in length. Captain Scorseby, who is now considered the highest authority, after examining some three hundred of these animals, states that he is fully convinced that they never have exceeded 100 feet, and their usual length is from 40 to 60 feet; their circumference being from 30 to 40 feet. This size has reference to the larger specimens. It has a mammiferous structure, as its class indicates, and has but one usually at a birth. Its teats or dugs are two in number, and are situated on the fore part of the abdomen, but in a few varieties of the whale, they are farther forward upon the breast. It is warm blooded; yet the entire external formation of its body adapts it for an exclusive residence in the water. Its huge body is covered with an oil or fat called blubber, from one to three feet in thickness. This oil protects the animal against any great reduction of its temperature, which must otherwise ensue from the conducting power of the water in the cold Polar seas which it inhabits. As much as one hundred and twenty tons of this blubber have been taken from a single specimen of this variety; every four tons of which yield three of oil, the article being known as the whale oil of commerce. The skeleton is also filled with oil, and weighs in the larger animals twenty-eight tons. It has an enormous head, constituting full one-third of its entire size, with a very short neck, not at all differing in size from that of the head. The body is the largest a little posterior to the neck, and is prolonged into a thick caudal extremity, armed with a horizontal, semilunar, cartilaginous fin, by which its passage through the water is effected; the tail constituting its chief weapon of defense. The Greenland whale has no scales, its skin being a dark velvet color; but in other respects its external appearance closely resembles fishes. It possesses no external ear. The sense of hearing is found located over the entire surface of the body, excited by the vibratory motions of the water, the least disturbance of which is quickly perceived, even at some distance. It has a very small eye, in size not exceeding that of the ox, which is situated about twelve inches obliquely posterior and superior to the commissure of the lips. The eye presents a peculiar appearance; the iris being white. The vision is said to be acute in the water, but very imperfect in the atmosphere. The sense of smell seems to be confined to the blow-holes, which are two in number, situated upon the top of the head, about twelve feet from the anterior surface of the jaws, and are continuous with the windpipe. Their shape corresponds to the openings in the top of a violin, being about twelve or sixteen inches in length. The sperm whale has but one blow-hole, situated much farther forward. The balæna mysticetus is obliged to come often to the surface of the water to breathe; having lungs similar to the land mammalia. It has, however, a reservoir of oxygenated blood, which enables it to remain under the water some twenty minutes in times of an emergency. The brain is stated by Cuvier to be large in proportion to the size of the body, yet very little is known concerning it, or the arrangement of its nervous system. The average weight of the brain is five pounds; while that of the elephant is nine pounds, and that of man is fifty ounces, or a little over three pounds.

The mouth of the variety under description, the *balæna mysticetus*, or Greenland whale, is a cavity of wonderful construction. Its dimensions, when open, in a full grown specimen, are in length sixteen feet; in width, twelve feet; and in height, ten feet—constituting quite a good-sized apartment. He was not familiar with the skeleton of the head any further than to state that it consists of a crown bone and enormous facial and jaw bones. The size of the head arises more particularly from this fact. The lower jaw is composed of two long, slightly curved bones, meeting in front, these bones being from twelve to sixteen feet in length, and filled with oil. In the sperm variety, they have cavities filled with spermaceti. The throat or gullet is very small, not exceeding one inch and a half in diameter. This is also different in the sperm whale, being in this family of whales from sixteen to twenty inches in diameter.

The Greenland whale has no teeth, and this is the point especially deserving of notice. It has a novel and wonderful apparatus as a substitute, composed of a number of vertical transverse plates, suspended from the crown and jaw bones, terminating in hanging, fringe-like processes, increasing in fineness toward the sides of the jaw. Near the crown bone these processes are few in number, and quite strong, but toward the jaws they increase in number and diminish to mere hairs in size. This substance is called baleen or the whalebone of commerce. The baleen is arranged in plates, by two rows of laminæ, resembling the laminæ of a feather. There are from 300 to 320 of these plates on each side of the mouth. The longest of these plates are in the centre, being about twelve feet, and diminishing to a point, front and back. A large whale yields full one ton of this baleen after being dried. These plates are curved longitudinally, and give the mouth a curved appearance. The curvature of the crown bone, upper jaw bones, and lip give the mouth the appearance of a ship's boat or yawl, turned upside down, presenting a superior deep cavity, with these ciliary or fringe-like processes suspended from the palatine arch. They float against the tongue, which is an immovable, fatty mass, situated between the bones of the lower jaw. With this apparatus, everything passing into the mouth is readily entrapped, to support this leviathan of the deep. From the size of its gullet and the absence of teeth, it would readily be supposed that the whale must feed upon excessively small particles of food, and this is the fact. It subsists chiefly upon sea blubber, composed mainly of animalculæ, acalephæ, etc. These animalculæ are of the medusia kind, and they cover the surface of the water to a considerable depth, giving it a deep-green appearance; embracing, as some assert, not less than 20,000 square miles of Greenland seas, which constitute the pasture grounds of these huge monsters. The whale feeds while passing through the water, its mouth being open and below the water's surface. During this act, breathing is carried on through the blow-holes. In this manner, everything upon the surface of the ocean, coming in its way, shrimps, sea-snails, small crabs, animalculæ, etc., is readily caught and retained by its enormous skimmer-like mouth, armed with this wonderful strainer-like apparatus; the water passing out at the sides of the jaw. He would close his remarks, by using the language of Mr. J. Hunter, who, in describing the formation of the baleen, remarks as follows:—

"This singular production does not proceed directly from the gum itself, but from a thin vascular substance resting upon it. This substance, which may be called the nidus of the baleen, sends out a thin, broad process, answering to each plate on which the plate is formed, so that each plate is necessarily hollow at its growing end, the first part of the growth taking place in the inside of this hollow. Besides this, the plates receive additional layers on the outside, which are formed in the same vascular nidus, as it extends along the jaw. This part forms a semi-horny substance between each plate, which is very white, rises with the whalebone, and becomes even with the outer edge of the jaw. This intermediate substance fills up the spaces between the plates as high as the jaw, and acts as abutments to the whalebones, keeping them firm in their places. In the growth of the whalebone, three parts appear to be formed; one from the rising cone, which is the centre, a second on the outside, and a third being the intermediate substance. These appear to have three stages of duration; for that which forms on the cone, I believe makes the hair, and that on the outside makes principally the plate of the whalebone; this, when of a certain length, breaks off, leaving the hair projecting, becoming, at the termination, very brittle; and the third, or intermediate substance, by the time it rises as high as the edge of the jaw, decays and softens away, like the old cuticle of the sole of the foot."

Dr. Suesserott remarked that although he had come entirely unprepared to take part in the discussion of this highly-instructive and interesting subject, he felt called upon to direct attention to the strong resemblance which the dental structures and masticatory arrangement of the Gorilla bear to those of some of our most powerful carnivorous animals, while it has been proved almost beyond a doubt that this wonderful animal is exclusively graminivorous. By way of illustration, he placed in juxtaposition a cast of the skull and lower maxilla of the gorilla and the skull and lower maxilla of the Polar bear, both taken from the Museum of the Pennsylvania College of Dental Surgery. Although the cranial development of the last named is not as large as the first, and the zygomatic arches of the latter are much larger than those of the other, yet the strong resemblance which the teeth bear to each other would lead us to believe that the diet of the two animals would be found to be almost the same.

From the recent History of Explorations and Adventures in Equatorial Africa, by Paul B. Du Chaillu, a work which, he regretted to say, is not as free from objections as could be desired, we learn that this powerful man-like animal is found only in the loneliest and darkest portions of the dense African jungle. That it is a restless and nomadic beast, wandering from place to place, and is scarcely ever found for two days in the same neighborhood. He attributes this great restlessness, in part, to the struggle which the animal has to make to find its favorite food, which consists in berries, pine-apple leaves, and other vegetable matters. Being a huge feeder, he soon eats up the scant supply which is found in any limited space, and is then forced to wander on in quest of new locations, which will for a time afford him the means of subsistence. In connection with the aforenamed articles, he is very fond of sugar-cane, the pith of trees, and a kind of nut with a shell so hard that it requires a strong blow with a heavy hammer to break it, but which readily yields under the action of the powerful masticatory muscles of this beast, who is lord of the forest; for he appears to drive elephants, leopards, and panthers before him, and does not quail before the gaze of man.

It would seem, also, from the observations of Mr. Du Chaillu, that the immense canine teeth of this animal are not used either as weapons of offense or defense, for a single blow from his powerful arm is sufficient to destroy the life of man, and many of the larger animals. In order to procure the pith of the trees of which he is very fond, he is compelled to use his teeth—and here is shown the cause of the wearing off that is often noticed in the teeth of some of the older animals. In size the gorilla varies as much as does man, adult males measuring from five feet two inches to six feet two inches. The arms are much longer, and more powerful than those of man.

When surprised, the male gorilla will not run away, but will advance, by short, jerking steps, upon his foe, giving vent to unearthly roars that are heard at the distance of two or three miles, and unless immediately killed, will prostrate his victim by one or two blows, and then walk off into the woods. He is not tenacious of life, but on receiving a musket-ball in his breast will fall upon his face, emitting a human-like groan, and die.

The subject of

"THE USES OF ARSENIOUS ACID IN DENTISTRY"

was chosen for next discussion.

SOCIETY OF DENTAL SURGEONS OF THE CITY OF NEW YORK.

THIS Association, which suspended its meetings during the summer and fall, has resumed its monthly sittings. A lively interest is manifested by the members, and frequent accessions to its numbers are being made.

A regular meeting was held on the evening of December 11th, 1861, Dr. F. H. Clark presiding. The subject for consideration, "THE FILLING OF DECIDUOUS TEETH,"* was opened by an interesting paper read by Dr. W. H. Atkinson.

The discussion was participated in by Drs. John Allen, Burras, Franklin, Perine, Latimer, Roberts, and others. It disclosed no new or novel theories or modes of practice, but coincided, in the main, with the views embodied in Dr. Atkinson's paper.

The subject of "FACIAL NEURALGIA" having been selected for the next evening's discussion, the meeting adjourned.

A regular meeting of the Society of Dental Surgeons of the City of New York was held at Cooper's Institute, January 8th, 1862; President in the Chair. In the absence of the secretary, Dr. G. H. Perine was elected secretary *pro tem.*

Present, Drs. Hurd, Parks, Burras, Latimer, Atkinson, Franklin, Stratton, Roberts, and Allen.

The minutes of the previous meeting were read and approved. The treasurer's report was presented and read, when, on motion, it was referred to the Executive Committee. The name of Dr. W. B. Ingersoll was presented by Drs. Perine and Atkinson. The name of Dr. O. A. Jarvis was presented by Drs. Hurd and Franklin. After the balloting, Drs. Ingersoll and Jarvis were declared unanimously elected members of the Society.

The subject for discussion, "FACIAL NEURALGIA," was introduced by the reading of interesting and instructive papers by Drs. Latimer, Perine, Atkinson, and Burras.

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* This paper will be found in another part of the journal.

On motion, it was resolved that the above gentlemen be requested to present the papers read to the Society, for publication; and they were referred to the Publishing Committee. On motion, that when we adjourn we do adjourn to meet this evening two weeks. It was also resolved that the same subject, "FACIAL NEURALGIA," be continued for discussion at the next meeting.

After an interesting and profitably-spent evening, the Society adjourned.

G. H. PERINE, Sec'y *pro. tem.*

The Society met, according to adjournment, January 22d, 1862; President, Dr. F. H. Clark, in the Chair.

On motion, Dr. G. H. Perine was elected secretary *pro tem.* The minutes of the previous meeting were read and approved.

Present, Drs. Burras, Stratton, Latimer, Franklin, Atkinson, Allen, Ingersoll, Hawes, Roberts. In addition to the members, quite a number were present by invitation. The increased attendance at each of the meetings, and the spirit which prevails, certainly speak well for the estimation in which the discussions are being held by the public.

We believe that these meetings will exert an influence for good to the public, and they cannot, we think, fail to benefit both the *parent science* and its legitimate offspring, dental surgery. Whatever tends to restore to the latter the lost affections of its parent and sister sciences should be hailed with joy by every member of our profession. On this ground, as well as for the ability with which this Society was founded and is being conducted, we hope it will receive the support of all who desire the advance of the interest of dental science; and we believe the Society of Dental Surgeons of the City of New York will be a rich boon to our profession.

Drs. Clark and Perine presented the name of Dr. George Clay. Drs. Atkinson and Allen presented the name of Dr. William H. Allen. After the balloting, Drs. Clay and Allen were declared unanimously elected members of the Society.

Dr. Burras, as one of the Executive Committee on the treasurer's report, reported progress; after which the subject for the evening's discussion, "FACIAL NEURALGIA," was continued, and was discussed pro and con. by members present.

On motion of Dr. Atkinson, it was resolved, that when we adjourn, we do adjourn to meet one week from Friday night, (January 31st, 1862.)

On motion of Dr. Franklin, it was resolved that the subject for the next evening's discussion be "DISEASES OF THE TEETH: THEIR CAUSE AND TREATMENT."

On motion, the Society adjourned.

G. H PERINE,
Sec'y *pro tem.*

MICHIGAN DENTAL ASSOCIATION.

The seventh annual meeting of the Michigan Dental Association was held at the Biddle House, in the City of Detroit, on Tuesday, the seventh of January, at seven o'clock, P.M.

President, Dr. Cahoon, in the Chair.

The minutes of the last meeting were read.

Election of officers postponed until to-morrow.

Adjourned to nine A.M., Wednesday.

Wednesday Morning.

Met pursuant to adjournment, and regular order of business was called.

Committee on order of business reported the following:—

1. Reading minutes of preceding meeting.
2. Reception of reports from officers and committees.
3. Election of members.
4. Election of officers.
5. President's address.
6. Unfinished business.
7. Reading essays and papers; remarks on same.
8. Payment of dues.
9. Miscellaneous business.

Report adopted.

The Secretary's annual report was adopted.

The following officers were elected, to wit:—

President—Dr. J. A. Robinson, of Jackson, Michigan.
Vice-President—Dr. I. Douglass, of Romeo, "
Secretary—Dr. J. A. Harris, of Pontiac, "
Treasurer—Dr. H. Benedict, Detroit, "

After a few remarks from the retiring President, Dr. Robinson was conducted to the chair, thanking the Association for the honor they had conferred upon him, hoping his intercourse with them would be as pleasant with them in the position he now occupied as it had been in his former.

The Vice-President took the chair, when Dr. Robinson read an interesting essay on "Plugging Teeth,"* which was ordered to be placed upon the records and published. The essay elicited a general discussion, mostly of a conversational form, upon the merits of the different foils used.

Dr. Cahoon spoke at some length, stating his method and experience in using foil of different manufacture; uses both soft and adhesive, but preferred soft, of Abbey's manufacture; also uses White's and Dunlevie's; always anneals before using, the adhesion being more perfect when all moisture was evaporated; it becomes solid, and can be built out to any degree desired; had observed that the great difficulty with some apparatus was, they cut up the gold after placing it in the cavity, so that it becomes entirely disintegrated, losing its adhesive properties, and becoming solidified. His method was to work gently at first, until adhesion was perfect, then condense.

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* This paper will be found in another part of the journal.

Dr. Metcalf wished to know whether the adhesion between soft and crystal foil was considered perfect. His experience at the South, where he had practiced extensively, did not prove to him that it was; thinks it must be owing to the dampness of the atmosphere; by annealing before using, had no difficulty; uses pellets, always fastening the first.

Dr. Robinson, in all his experience in filling, building out front teeth with crystal gold and Abbey's soft foil, the union was perfect; that he was daily convinced of the fact by seeing many cases of his own practice that had stood the test of years, and he rejoiced to see the profession daily and yearly rising to occupy its appointed place, which stood second to none.

Dr. Benedict wished to make a few remarks on the essay in the shape of criticisms, in regard to his method of plugging teeth.

Dr. Robinson appealed to the paper to show his meaning, which was declared satisfactory.

Dr. Benedict uses both soft and adhesive foil, using the soft at first, and finishing with adhesive—the secret of success being in the care in which the operator handles his foil. We may be as careful as possible, it will gather moisture from the insensible perspiration of the fingers; therefore the foil should always be annealed before using.

Dr. White read an essay on "Treatment of Diseased Nerves and Fangs."

In the remarks that followed, it was thought that too much arsenic was generally used; that after treatment the tooth must be entirely well, devoid of all soreness either internally or externally, the nerve removed to the apex, healthy granulations formed; that unless these results had taken place the chances were against the success of the operation. In destroying nerve always make the nerve bleed, or uncap it by removing the decay, and in most cases the pain will cease. Any substance placed in the cavity without this precaution will produce pain, and upon the return of the patient you will have to do what ought to have been done at first.

The Association then took recess until two o'clock.

After recess, Dr. Cahoon read an essay on "Dentistry as a Profession,"* which was ordered to be placed on record. In remarks, the subject of prices was discussed warmly, especially prices of vulcanite, it being contended that a severe blow had been struck the profession in regard to it. Although it was held to be vastly superior to a majority of materials used for bases, a general feeling was manifested that the prices must be kept up or the profession go down. Dr. Cahoon was in favor of putting the prices of rubber to its former mark, and hoped the Association would take some action on the subject; the public had been benefited by the improvements of the profession, and the dentist should have a fair remuneration for his services.

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* This paper will be found in another part of the journal.

Dr. Robinson did not think we ought to be extortionate, but was in favor of keeping up the price; was of the opinion that rubber would last equally as well as gold.

Dr. Benedict liked rubber, but did not use much of it, as he did not wish to compete with those that were making it at mechanics' wages. Many were using it with license, and were evidently trying to see how cheap they could make it.

A letter was read from Dr. Bartlett, of Battle Creek, which was ordered to be placed on file.

Dr. Robinson offered the following resolution:—

Resolved, That it is unprofessional and ungentlemanly for any member of this Association to leave his place of business and visit neighboring towns for the purpose of getting work, where there is a resident dentist belonging to this Association, unless particularly solicited. Unanimously adopted.

Moved that the secretary issue a warrant on the treasurer to defray the expenses of room, etc.

Moved that the secretary issue a warrant on treasurer to the amount of six dollars, for balance due Dr. Cahoon.

Moved that a vote of thanks, to the proprietors of the Biddle House, for the use of room, and their gentlemanly bearing to the Association, be given. All of which were adopted.

The following gentlemen were appointed to prepare essays on the subjects assigned them:—

Dr. Douglass, Diseased Antrum.
Dr. White, Vulcanite.
Dr. Mansfield, Treatment of Exposed Nerve.
Dr. Benedict, Dental Fees and Etiquette.
Dr. Metcalf, Filling Teeth.
Dr. Bancroft, Alveolar Abscess.
Dr. Harris, Extracting Teeth.
Dr. Porter, Taking Impressions.
Dr. Cahoon, Best Material for Artificial Dentures.
Dr. Robinson, History of Dentistry.

Moved that we now adjourn to meet in the City of Kalamazoo, on Tuesday, the 27th of January, 1863, at 9 A.M.

All were pleased to see Dr. S. D. Palmer on hand, as usual, with a large supply of teeth, instruments, etc.

Dr. Pritchard, of Rochester, was also present.

J. A. Harris, *Cor. Sec.*

EDITORIAL.

ATMOSPHERIC-PRESSURE PLATES.

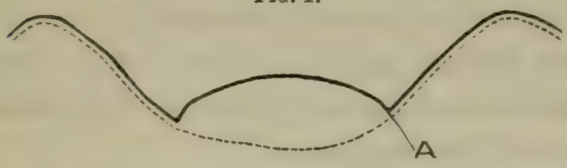
This article ought to have come under the head of Practical Hints, but it did not suit, owing to circumstances. We did not intend so soon to refer to the "Gilbert Central Cavity Plate," after having done so in two articles recently. Our observation seems to show, from the cases which come to us from all parts of the country, that either we have been instrumental in doing a great deal to establish an erroneous construction of the chamber or cavity, or that the profession generally has fallen into a grievous error about it. In case any of the fault lies with us, we hasten to correct it as much as possible.

The recent discussion on atmospheric pressure has not elicited any more about the subject than was previously known, nor has it corrected any errors under which the profession has been laboring. If it has, we cannot see it. The second letter we received from Mr. Gilbert did more to enlighten us on a proper construction of the chamber than all we ever read before, and to which we referred in the January number of the Dental Cosmos. We do not wish to discuss any principles—with those every one is acquainted—in relation to atmospheric pressure, but practically to show how to avail ourselves of its advantages.

A shallow and broad cavity is not the best way to obtain the full value of atmospheric pressure. The air is too soon lost on account of the *shortness*, so to speak, of the vacuum; the *higher* the vacuum the longer it will require to be filled by air, and the more readily will the patient be enabled to exhaust it by suction. We may say that the patient has more leverage on an operation, and therefore more power over it. The variation from the rule we will leave to the judgment of each operator as to whether the cavity may be shallow, wide, or narrow; but to depend upon the alveolar border for atmospheric pressure, a part which is changing as long as a patient lives, is simply absurd in itself; the stationary point, the roof of the mouth, is the place to work from. We hope we will be excused for making this article a little desultory. A distinguished judge called to see us about a month since, for whom we had placed in the mouth an entire set of artificial teeth two years ago. He could exhaust the air from the cavity, and the job would be fixed firmly to the roof of the mouth; but on attempting to chew, or in speaking for a length of time, the teeth would drop. The gums had changed since the plate had been made. He suggested the propriety of reconstructing it so as to obtain a better fit, which would, in all probability, overcome the difficulty complained of. As we regarded the case a failure, we concluded to try an experiment with it, as we could not make it less useless. We held the set of teeth in the palm of the hand, and battered the cavity deeper with a small riveting hammer, and placed the job in the mouth. "Why," he remarked, "what have you done to it? It never felt so firm before! I have no trouble in exhausting the air at all!" The teeth are now useful in mastication. We have *stretched* a good many cavities since then, successfully.

We will cite another case, of which a drawing will be found below. Five or six years since we made a plate with three or four teeth, bicuspids, adapted the plate well; the pressure was complete, but the case useless for chewing. It was laid aside for a time. As the front teeth of the patient were wearing away very rapidly, he called to see us again, about one year ago, hoping to get something made to chew on, as the front teeth had become short and tender, and one or two more back teeth had been lost. As we had an assistant who was one of the very best and most ingenious operators in artificial work, we placed the patient under his hands; a *vulcanite* plate was proposed, because the *metal* plate had failed. The job was made up, the fit was complete, but failed as well as the former one. It was let alone until recently, when we had a silver plate struck up with a chamber constructed as represented in Fig. 1, but a little broader than was intended, or is required. Still it answers every purpose for chewing; the pressure can be graded to suit the wants of the patient. The black line represents the plate, the dotted line the roof of the mouth. We always swedge up the plate so that the margin of the chamber at A shall be as sharp as possible, and fill in the upper part of the plate so that the sharp margin can be reduced at will without cutting through the plate at that point, in case it is too severe on the mouth. We also double the plate back of the chamber, so that if in time it impinges too hard on the roof of the mouth it can be filed away. A plate which cannot be altered from time to time is in a manner useless to a patient. We take great care now to spring the chamber like an arch directly from the gum, as we can get a closer fit than the old way. We also place the cavity on the roof of the mouth, and as free as possible from contact with the corrugations frequently met with on the anterior part of it. A plate constructed with a cavity or chamber is a *suction plate*, and nothing else; and it is the best way to avail ourselves of the full force and advantages of atmospheric pressure for dental purposes. J. D. W.

FIG. 1.



REVIEWS.

On account of the large amount of original matter presented this month, we have been compelled to defer the publication of the material selected for the Review department until the next issue. Believing that the vitality of the magazine depends more upon original communications than material selected from other magazines, we gladly accord the required space. J. H. M'Q.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Dentition of the Adult Salmonidæ traced to a Generic Type.* By ROBERT KNOX, M.D., F.R.S., Edinburgh.—The Salmonidæ, constituting a widely-extended natural family, have been subdivided into three sub-families or groups, known generally by the names of Salma-salar, Salmo-fario or forelle, and Salmo-trutta. In their highest specialized condition —that is, as adult individuals—all the species of these sub-families differ essentially from each other; the young, on the other hand, of any of the species, possesses in itself the characteristics of all. As adults, they differ in their external characters and internal structure; when young, they all agree. It was Goëthe who said, I think, that anatomists should endeavor to find in the brain of the embryo the elements of the brain of the adult—in the brain of the fish the elements of the human brain. The problem may safely be widened: in the young of any species of any natural family, you may find the characteristic elements of the adult of all the species of that family. In a word, the dentar formula of the young of any species of the salmonidæ embraces the materials for the dentar formulæ of any species of all the sub families when adult.

"I confine my remarks to the teeth carried on the vomer, these being the characteristic teeth. We have already seen, in the preceding section, into what confusion M. Valenciennes was led by neglecting the laws of development and edentulation in the salmon. Let us now trace the development, growth, and decay of this simple generic formula to the adult of the sub-families best known to us. It is a philosophic, and not an empirical, inquiry. Suppose we trace its history first in the true salmon. When five or six inches in length, the dentition of the true smolt is common also, with the salmonidæ, of whatever species or sub-family, when young. At a pound weight, and from that to two pounds in weight, the dentition is rapidly adopting the form of the adult salmon, which, at twenty or thirty pounds, is limited to the anterior group on the vomer. By this we discover that no new law of specialization appears; it is simply a law of *edentulation*, in passing through which, as regards the vomerine teeth, the true salmon assumes successively every form which the system can assume in any species of the salmonidæ Trace now the Forelle, and we shall find that the same law holds good. In the young forelle, the dentition is as in the young of the true salmon; at a pound or two more, it has not unfrequently wholly lost the double row of mesial teeth, and has already assumed the dentition of the true adult salmon. In the species of the forelle which appears in the London markets in June and July, and which seldom grows to two pounds weight, most of the individuals have a double row of vomerine teeth, in addition to the transverse, or those of the chevron; some, however, are beginning to lose the double row from behind forward; and in a few the double row is reduced to three or four just behind the teeth on the chevron. In no instance, in this species, have I found this double row reduced to *a single row;* so that by M. Valenciennes' law a species of the forelle, the most common in our markets, would be excluded altogether from the sub-family forelle, some of its members being classed with the true salmon, others with the common river trout. On the other hand, of the forelle which ascends the rivers later in the year, there is a much larger kind, in which the double row of teeth on the vomer is reduced to a single row, at least for a time. The mesial row, from being double, has become single; and it was this accidental and changing condition in the forelle which M. Valenciennes mistook for a permanent and fixed character. But soon this also disappears, to a greater or less extent, and even in this species the fish assumes the dentition of the adult salmon.

"Lastly, the river trout, which has, when young, the generic dentition of the salmon, retains this dentition throughout life, or at least to a very large size. That species of the trout may be found in which the loss of the anterior group is a constant condition of the adult state, I will not deny; it seems to me to occur as a law in certain lake trout from the north of Ireland. Neither do I deny that there are species of the forelle which, by retaining a single row of mesial vomerine teeth, confirm the opinion of M. Valenciennes, to this extent—namely, that there are species of the forelle characterized by a *single row* of mesial vomerine teeth superadded to the group in front; but the extent of inquiry I have instituted into the history of the salmonidæ satisfies me that no such formula is applicable to the forelle generally, and that the *single row* of mesial vomerine teeth is a transitional formula not a permanent one, perhaps of a species or two, but not of any sub-family of the salmonidæ; a transitional formula, through which most true salmon and sea trout pass as they progress from the young to the adult condition.

"If to these we add the formulæ of the Continental and American species, we shall find the dentar formula applied by M. Valenciennes to the salmonidæ wholly inapplicable, inasmuch as there are species which fill up every gap or link in the series.

"Thus the young of all these species, however much they may differ when adult, have precisely the same dentition which approximates to that of the adult river trout; and thus it is by the loss of certain teeth, and not by the superaddition of new ones, or by the adoption of a new system, but by the law of edentulation, in fact, the young is so metamorphosed as to require the specialization of the species or sub-family to which it belongs. The *possible* of all is contained in the young, in so far at least as regards a natural family. It is the embryo and the young which are perfect; it is the genus or natural family which is perpetuated by the law of descent, stamped with the character of individuality as regards each species or individual. Hence the likenesses which occur, and the resemblances to other species than the one to which the individual may happen to belong. But these *generic resemblances*, as I may call them, do not persist unless aided by other circumstances as yet unknown. The misapplication of this law has misled physiologists into the belief that distinct species might so originate. Pritchard and others have applied the doctrine to man himself; they call it the accidental production of species; yet there is nothing accidental in it. Moreover, the likeness, which happens to be generic and not specific, persists not, but perishes with the individual, or, at least, after a few generations. Were it otherwise, what would become of the existing order of things?

"The same law holds good with all the external characteristics. Take, for example, the coloring. Three systems of coloration mark the adult of the three great sub-families of the Salmo; these are red spots, dark spots of two kinds, and silvery scales. The young of all the species of all the sub-families possess the three systems. As they grow up to the adult condition, one sub-family retains the red spots only; a second, the dark spots of one kind; a third, throws off both, retaining the silvery scales only, or nearly so. Or, to be more precise, the young of all the species have at first red spots, dark spots, and par markings; to these add silvery scales. The pure salmon, when in the finest order, is characterized by the absence of nearly every kind of spot or marking. He not unfrequently retains a few above the lateral line; but their presence, when they exceed a few, throw doubts as to the purity of the breed. The fario or forelle, on the other hand, retains numerous dark spots above and below the lateral line, and his quality may in general be judged of by the number of these spots. If numerous, he approaches the sub-family lower in the scale; if few, he partakes of the character of that placed above him—namely, the salmon. I have sometimes thought that this law applied to many natural history characters. Thus, in respect of the dentition, we have seen that the early summer forelle, which is excellent to eat, but grows to no great size, obeys in its dentition the laws of the true salmon—that is, it passes rapidly, if at all, through that form of dentition (a single row on the body of the vomer,) which seems to characterize the large and much coarser autumn forelle. The forelle called the spey trout seems to be another instance of the law; it is excellent eating, and by many of its natural history characters approaches the nature of the true salmon. On the other hand, if I mistake not, I think I have met with a coarse kind of forelle, which retained up to three or four pounds the dentition of the common river trout; it was of a pale-yellow color, and not good to eat. Certain lake trout retain only the dark spots, others the red; the common trout of rivers retain only the red spots; with these one species includes the par markings. These par markings, characteristic of the young of all the species of all the sub-families, have given rise to many discussions. They are *generic* characters, which, being at one time held to be *specific*, at another *generic*, have led to discussions seemingly interminable. Into this question I do not enter here. It is sufficient for me to show that they are generic characters common to many species, and cannot therefore be employed to characterize one species or sub-family more than another; unless they persist to the adult condition, and then they may be viewed as specific. Thus the young of any species, were our observations sufficiently minute, might furnish the distinguishing characters of all the species composing a natural family. Further, as it includes within it individually the elements of all, it provides for the extinction of some and the appearance of others, new to the earth's inhabitants, but already prepared, already existing in *the possible;* when *real*, and only then, they fall within the scope of human observation. I meddle not with the question in how far the embryo shadows forth the type of all that ever lived or may live hereafter. I believe it does; but science forbids as hasty and premature the anticipating of what Nature may choose to do. As an anatomist, I adhere to the *real*. The problem, moreover, may be more conveniently discussed in a subsequent chapter.

"To avoid the charge so often made against transcendentalism in zoology and anatomy, I submit to the reader the following details:—

"The names of incisive, canine, and molar have been given to certain teeth in the higher mammals, in the upper and lower jaws. As in the lower jaw all the forms are carried upon one and the same bone, there can exist no peculiar relation between these forms and any particular bone, even allowing for the primitive fusion of germs in the lower jaw. In the upper jaw, on the other hand, the incisive teeth are presumed to be carried on the inter-maxillary bones only, and to be peculiar to these. The canine and molar belong to the upper maxillary bones. Whatever, then, be the form and use of the teeth carried by the inter-maxillary bones, they are called *incisive ;* the next following these, carried by the maxillary bone, on either side, are called canine, whatever be their form; and to those which follow, the name of molar is always given, whatever be their shape. This arrangement some view as typical, and in the mammal, which has the largest number of teeth of all the classes, they find the archetype. For my own part, I do not adopt these views. The actual type or plan held in view by Nature must, of course, be entirely unknown. The tusks of the elephant are by some called canine, being presumed to be implanted in the maxillary bones. This was Goëthe's view; but he seems to me to have been in error, for these teeth are carried by the inter-maxillary only, and in this view are incisive. The powerful chisel-shaped teeth of the rodents are named incisives, not so much from their obvious functions, as because they are said to belong to the inter-maxillary bones; but even this may be disputed, for to me they seem to spring from the maxillary bones, and this, also, was Cuvier's opinion. My brother, after a very careful inquiry into the position of the chisel-shaped teeth in the beaver, thought that they sprang from the lachrymal bones. If this view were fully proved, the chisel-shaped teeth of the rodents have no representatives or analogues in other animals, and the dentitive type would be, in reality, more complex than it is supposed to be.

"In the lower classes of animals, as fishes, the bones, which in the upper jaws reach the mucous surface, become provided with teeth—the inter-maxillary, the maxillary, the palatine, and the vomer. There may be others. That which is certain is, that in whatever light we view the jaws, whether as appendicular parts of certain cranial vertebræ, or, as Goëthe did, vertebræ themselves, the teeth are the osseous phaneric coverings of the extremities of the sensitive portion of the fifth pair of nerves. Their final ossification and disruption from the other living tissues, which in man requires seventy years or more, is in the serpent and in the fish performed in a few months; but the phenomena are essentially the same, though effected in different ways. The teeth, then, are not absolutely dead parts, nor even so in the sense assumed by Cuvier and De Blainville; but their tendency is to become so. This event may or may not coincide with the absorption and disappearance by age of the alveoli. The loss of the alveolar cavity may precede the death of the tooth; it may coincide with it, or it may follow it.

"There is a type which is unknown: elastic, variable, shadowed forth probably by the forms of the embryo or young, but not so surely as to lead to a positive proof, in all cases, of the manifestation or specification. That the teeth in the fossil mammals differ from those now existing in respect to number and form was to be expected. They might differ also in their mode of succession: all the molars may have been preceded by deciduous teeth. This may or may not be true; but one thing is certain, they offer no new principle sufficient to establish another order of creation. In the higher mammals we find an unknown *number* of *series of* *teeth;* naturalists consider the *number* as known and fixed. I doubt it. The terms incisor, canine, and molar do not, I believe, include all. The chisel-shaped teeth of the rodents stand apart. The vast tusks of the elephant are called incisive by some, canine by others; it is quite possible that they belong to neither series. The pretended incisives of the rodents start from the maxillary; and in some, perhaps, from the lachrymal bones. In some mammals one class of teeth occupy all the bones without distinction, as in certain whales. Thus it becomes evident that, as regards dentition, even in mammals, there exist some higher generalizations than have been as yet attained by anatomists.

"A last question remains—the origin of natural families: Have they been distinct from all times? I think not. As a hypothesis which has some facts in its favor, I venture to think that the law of unity, as I now speak of it, extends to all. The living zoological world, as it now exists and has existed, is a self-created, self-creating world—ever alive, never decaying, never old. Life is coeval with the globe.

"In support of a belief in successive creations, first maintained by Cuvier, analogies between certain geological epochs and certain forms of life have been attempted to be established. But the proofs are not clear; and although there are some facts which seem to show that in the successive development of the human embryo up to its specific individualism, we have metamorphoses which shadow forth the successive geological epochs from the beginning of the world, as marked by the forms of life then appearing and existing, yet it is right to caution the student that the theory as to the connection of the geological epochs with the successive forms of life detected in them is as yet based on no safe grounds. I always doubted it, and do so still.*

"The extinction of species is more mysterious than their first appearance on the earth; nevertheless, it must be referred to the same cause—a change, namely, in the existing order of things. The change generally must have been sudden, else we could have few or no organic remains, the carnivora being then as active, no doubt, as now.

"The transmutations I have spoken of in this chapter were ascribed by Goëthe and his followers, as is usual in German philosophy, to a variety of causes. They trace the domestic races of the ox to the fossil, and ascribe the changes to domestication carried on 'through millions of years.' Did man, then, live millions of years ago? I, for one, am not disposed to deny anything peremptorily in the physics of the globe; but surely those who maintain such a doctrine are bound to offer some few facts, at least, in support of it. Goëthe put forth the formule that 'the differences of forms result from the varied influences of the external world; and to explain these differences, at once constant and characteristic, we may admit primitive and simultaneous differences, combined with successive modifications of daily occurrence, (qui s'opèrent tous les jours.') This is but a truism; the next is better: 'A universal type, with a perpetual mobility of its forms, in reality is the real.'

"The elasticity of this type is thought by the German school to explain the existence of all the species of all the genera we are now acquainted with. 'The germ of any animal,' observes Goëthe, 'is,' in the possible, 'the germ of every other.' This is the highest generalization. It connects the living and extinct world into one great self-created chain; it connects it with the physical history of the globe itself—formed by a word, developing in its history an idea—that idea the universal and the eternal. Physically speaking, it means the development of the eternal germs of life in time and space, agreeably to laws inherent in their nature; the material forms they assume is the combined result of these laws and of the external circumstances in which they are placed."—(*Lancet.*)

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* Mr. Greenhow seems also to have doubted the theory.

On the Intermaxillary Bone and its Relations to Hare-lip and Cleft Palate.—The Bonn correspondent of the *Medical Times and Gazette* gives the following summary of a paper on this subject, read by Professor C. O. Weber before the Scientific Association of the Rhenish Provinces and Westphalia. It "was illustrated," he says, "by a beautiful series of preparations, showing the different degrees of the incomplete union of the lip and the palate. The author introduced his subject by stating that the great German poet Goëthe had been the first to show the existence of the intermaxillary bone in man. This view had at first been very much contradicted, but it was now universally adopted, and it was, in fact, easy to show this bone in the skull of a newly-born infant. It was this bone, the development of which was of so great an importance for the shape of the upper lip and the palate. The natural cleft lip was the normal formation in the hare, the camel, and the lamb, while in man it was exceedingly rare, and only connected with the complete deficiency of the intermaxillary bone and the soft part corresponding to it, viz., the filtrum. The terms hare-lip and the wolf's gullet (as cleft palate is called in Germany) were, therefore, not correct, as the locality of the malformation was generally different. The evolution of the mouth and the jaw in the human fœtus was then described. In the second week of fœtal life several lobes grow up at both sides of the head below the brain-vesicles; these are the so-called branchiate arches or facial lobes, of which the two upper ones correspond to the upper jaw, the second to the tongue, the third to the lower jaw, and the fourth to the hyoid bone. The three lower ones unite, while between the lobes of the upper and the lower jaw a cleft remains which forms the mouth. The frontal lobe, from which the nose, the middle part of the lip, and the intermaxillary bone are formed, grows afterward between the two lobes of the upper jaw. The anterior portion of the lobes is, in the course of time, changed into soft parts, the posterior one into bone. The development of these parts is independent of each other, and, therefore, a deficient union of soft and of osseous parts may exist, the one without the other, although they are often found combined. If the evolution is impeded at an early period, the growth of the parts in another direction is not prevented thereby; and according as the impediment occurs early or late, and is complete or incomplete, a great variety of malformations is the result. The highest degree of it would be double facial and palatal cleft, if the frontal lobe did not unite at all with the upper maxillary lobe, and were further developed without reference to the latter. Such complete clefts, however, have, until now, only been observed on one side. If the upper part unites with the frontal lobe, while there is a unilateral cleft in the lower one, we have unilateral hare-lip and cleft palate; the hare-lip then leads through the corresponding nostril into the cleft palate. If the deficient union of the frontal lobe with the upper maxillary lobe only affects the soft parts anteriorly, there is unilateral or double hare-lip of different extent; and if the soft portions of the face unite, the osseous parts remaining apart, there are clefts of the palate and of the jaw.

"The causes of the origin of this abnormal evolution in the fœtus are still involved in much obscurity. It is true that in some cases the affection has appeared hereditary, but this is by no means the rule. An influence of the imagination of the mother upon the evolution of the embryo, which is believed to be the cause by the people, cannot *a priori* be denied, as the influence of the mind on nutrition is evident to every one. Most of the cases, however, which are mentioned in support of this hypothesis cannot be accepted as proofs, as in them the mind of the mother was only affected long after the defective evolution had commenced. As these clefts of the lip and palate are to be distinguished after the sixth week, fright of the mother could only cause them if it occurred during the first few weeks of pregnancy. Professor Weber showed a preparation of a fœtus of three months, with total cleft of the lip and the palate."

"*A Case in which Artificial Teeth were lodged between the Tongue and Epiglottis.* By JAMES PAGET, Surgeon to St. Bartholomew's Hospital.—The following case seems worthy to be added to the records of foreign bodies found in places where they were least likely to be, and producing symptoms very similar to those of organic disease :—

"In July, a gentleman, sixty years old, after being engaged all day in more than usually fatiguing business, and exposed to cold air, felt faint and ill in the evening, and went to his bedroom at the hotel in which he was staying. While lying down, faint, or, perhaps, in the beginning of a slight epileptic seizure, he asked the servant to take out for him his artificial teeth—nearly complete separate sets for the upper and lower jaws. The servant, he believed, took them out. Of what immediately followed he could remember nothing more than that he became much more ill, with difficulty of breathing, and a sense of choking and suffocation, in which, in great anxiety and alarm, he sent for medical help. He was found suffering with much difficulty of swallowing, and some dyspnœa. His tonsils appeared much enlarged and unusually red. These symptoms were treated, and in some measure relieved ; and when one set of his teeth was missed on the day after the beginning of his illness, his medical attendants, who suspected that they might have been swallowed, were begged not to speak of them to him, for fear of the excitement and alarm that such a suspicion might excite in him. All the severity of his symptoms being subdued in a few days, the patient returned to his house at Rhyl, where Mr. Theed, as usual, attended him. For the first few days, Mr. Theed saw appearances of slight inflammation of the fauces, but these soon subsided : from that time nothing morbid could be seen in his throat. He had considerable and increasing difficulty of swallowing, was obliged to drink very slowly, and to cut all his solid food into very small fragments, and force them down his throat with gulping. Occasionally he was almost choked by food becoming involved in a tenacious mucus, which appeared to be secreted in large quantity at and beyond the fauces. Occasionally, also, he vomited after taking food. He had frequent short, 'hacking' cough; and once or twice hawked up a little blood. He suffered no considerable pain; but felt constriction about his cricoid cartilage, and always referred to that part as the seat of obstruction, hindering his swallowing. His voice was rough and rather hissing; his breathing sometimes with wheezing.

"Many times, while watching these symptoms, Mr. Theed suspected that they were due to some foreign body in or near the larynx : but he could see none; and the patient, as often as inquiries were directed to this point, declared somewhat impatiently that the thing could not be. Especially when, with the tardily given permission of his relatives, he was asked if the false teeth, which he had lost on the night of his illness, might not have slipped into his throat, he maintained that it was quite impossible; for what he had lost was a whole upper set, which, he believed, had been unluckily thrown away with the water into which they were put at night. The piece was far too big, he said, to go into his throat, or to be there without his knowing it. However, as none of his symptoms diminished and he was becoming very thin and feeble, Mr. Theed, in November, brought him to London for consultation. His feeble appearance, his dull, pale face, his emaciation, and the recital of his case, made me fully expect that he had cancerous stricture of the upper part of his œsophagus. On examining his mouth and fauces, I could see nothing unnatural, till, on extremely depressing the back of the tongue, I saw something white near his epiglottis—but too obscurely to guess what it was. Passing my finger to the side of the epiglottis, I felt eeth there, and soon hooked out the whole lost set, [which consisted of a full-sized gold-plate mounted with nine teeth, and having three spaces for normal teeth.]

"The piece lay between the base of the tongue and the epiglottis, very closely fitted to all the surface on which it rested. The teeth were directed upward, and I believe the incisor teeth were next to the epiglottis, and the notch in the palate-plate next to the root of the tongue.

"The most remarkable point of this case, next to the fact of the patient being unconscious for more than three months of what he had in his fauces, is, that a thing so large as that described could be out of sight at the root of the tongue. It may be well, therefore, to repeat that it was completely invisible, except when the base of the tongue was exceedingly depressed, and even then only a small part of it was obscurely seen. To this, and to the patient's dread of any other examination than that with the eye, it must be ascribed that the lost teeth were not discovered long before I saw him.

"It may be worth notice, that the patient referred to the parts about the cricoid cartilage as the place of obstruction in swallowing. This may be an instance of transference of morbid sensation, similar to that by which the irritation that excites coughing, wherever its true seat may be, is felt as if it were at the top of the larynx. A similar deceptive transference of sensation was observed in a lady whom I saw with what I supposed to be cancerous stricture of the upper boundary of the œsophagus. She always pointed to the cricoid cartilage as the place of obstruction: but her disease proved to be a cancerous ulcer of the tongue immediately in front of the epiglottis, and her pharynx and œsophagus were healthy.

"Since the removal of the displaced teeth, the patient has regained health, and Mr. Theed's last report of him is, 'I think him as well as before' the accident.

"P.S.—Since this narrative was in print, Mr. Theed has written that the patient has had 'a very severe attack of epilepsy, which lasted for five or six hours, during which time the convulsions were so violent that if I had not removed (though with great difficulty) his *full* set of teeth, he would inevitably have broken them into pieces. This, I think, elucidates the previous mystery.'"—(*Med. Times and Gaz.*)

"*Experiments with Kerosolene, and Cases of its Successful Employment.* By ASA HORR, M.D., of Dubuque, Iowa.—Having observed in the *Medical Times* a notice of the new anæsthetic, kerosolene, I sent to Mr. J. Downer, 76 Water Street, Boston, for a sample for trial, and obtained on the 28th of August last, for the cost only of bottle and packing, one gallon of kerosolene, with the request that I should make a careful observation of its effects and report the results. Accordingly, the following notes and remarks are submitted for publication:—

"EXPERIMENT I.—Was upon myself, one hour after breakfast, by applying two drachms of kerosolene to a large napkin, and inhaling it slowly and persistently until the cloth could no longer be retained to the mouth. The effects produced were nearly similar to those I had often experienced from chloroform, but with a greater feeling of buoyancy and less thrilling noise in the head, leaving no nausea nor giddiness. Half an hour after I repeated the inhalation, breathing the vapor vigorously for thirty seconds, and then ceased before any effect was perceptible. Immediately the effect began, and continued to increase during fifty seconds, when it gradually declined, and in two minutes more was entirely gone, leaving a sensation or taste in the fauces and about the molars like that from the contact of two metals in the mouth, which wholly subsided in a quarter of an hour.

"EXPERIMENT II.—Was with my son, nineteen years old, in good health, with the pulse at eighty per minute, who held the napkin in his own hands, with instructions to inhale vigorously until he could no longer retain the hands to the mouth. In twenty-five seconds he announced the beginning of anæsthesia. In one minute and a half from the first, the napkin fell, followed by a few bursts of laughter, then by full anæsthesia, which lasted one minute. In six minutes more he was fully recovered, and walked deliberately out of the room. The pulse during forty-five seconds remained at eighty, then increased during two and a half minutes, reaching one hundred, and during the next minute subsided to eighty, and at the end of the sitting to seventy. In other respects it was not altered from the natural standard. He observed a taste similar to the smell of gas works, and experienced a slight smarting of the fauces.

"EXPERIMENT III.—Was with a healthy, stout-built man, aged twenty-two, to whom the vapor was administered very gradually, to the extent of semi-consciousness, with no unpleasant effects. The influence of the kerosolene passed wholly off in a few minutes with no marked peculiarity.

"EXPERIMENT IV.—Was made just after supper upon my wife, aged thirty-seven, in feeble health from pulmonary disease. She inhaled from a napkin, in the same manner as she had often employed chloroform for pleuritic and colic pains, and came under its full influence quite as promptly and agreeably as from her accustomed anæsthetic. She objected at first to the trial, fearing so soon after a meal vomiting would be induced if it acted like chloroform. In ten minutes after waking all effects were gone, leaving the stomach undisturbed, and the head quite free from the usual unpleasantness following chloroform.

"At the same time I repeated the experiment upon myself, in the same manner and with like results as before. Having thus far perceived nothing to deter me from the further trial of kerosolene, I ventured cautiously upon its use with some of my patients.

"CASE I.—August twenty-ninth, administered kerosolene to a stout, middle-aged Irish woman, seven months pregnant, for the extraction of two teeth. Seven minutes were occupied in procuring the requisite degree of insensibility, when the teeth were removed with no resistance, and without her knowledge. She awoke one minute after with no unpleasant consequences. When asleep, the left eye for a moment was perfectly closed, while the right stood widely open, and the hands and feet were at the same time slightly convulsed. Breathing and pulse regular all the time. Face slightly pallid during the operation. In twenty-five minutes from the first inhalation, she walked from the office quite recovered from all effects of the vapor.

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"Case III.—Mrs. R., aged twenty-one, in good, general health, and nursing her first child, four months old, suffered severely from three carious wisdom teeth, which she desired extracted with the aid of an anæsthetic. She had often taken chloroform, always requiring a large amount, for severe neuralgic pains during pregancy, and also at her accouchement, with uniformly good effect, except that vomiting was often induced. I decided in this case upon the use of kerosolene, and employed *one ounce* before she became insensible, occupying a period of ten minutes. On endeavoring to open the mouth found the jaws firmly closed. Just then the eyes turned obliquely upward, the pupils were largely dilated, and the face suffused, while the arms and legs were slightly convulsed, exactly resembling a common fit of fainting. On immediately lowering the head by tilting the chair far back the fit passed off, leaving her thoroughly etherized. One tooth was now extracted, when she instantly awoke. The kerosolene at hand being gone, chloroform was substituted, when she immediately grew pale and vomited. The other two teeth were now easily removed without her knowledge.

"During the whole time of administering the kerosolene the florid tint of the face continued, and the pulse beat regularly and full. The breathing was partially suspended during the apparent syncope. No unpleasant symptoms followed the operation.

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"From prudential considerations I now decided upon another method of testing further the action of kerosolene, employing it in union with chloroform with *all* my cases requiring an anæsthetic; beginning with one part of the former to five of the latter, and increasing the kerosolene slightly with each successive case, until the proportion of half and half by measure was reached. In this manner the mixture has been given in five obstetrical and fifteen minor surgical cases; to three of the former and seven of the latter in the last-named proportions, and in all with uniformly happy and satisfactory results.

"The use of this compound appears to be attended with less disturbance of the stomach, fuller circulation in the capillaries, and less irritation of the air-passages during inhalation than chloroform; otherwise, its action is precisely as if no kerosolene were added. The amount by measure to produce a given effect is but slightly greater than would be required of chloroform. An obvious advantage in favor of kerosolene is its exceeding cheapness; being afforded, it is said, at seventy-five cents per gallon.

"I propose for the present to continue the use of the half-and-half mixture, hoping ere long to profit by the experience of others who may be inclined to report these experiments, and extend their observations further than I have done."—(*Amer. Med. Times.*)

"*On the Condition of the Mouth in Idiots.* By J. Langdon H. Down, M.D., London, Physician to the Asylum for Idiots, Earlswood.—The condition of the idiot is not simply one of mental alienation. It frequently presents also grave physical deterioration; and this physical alteration is as much a test of idiocy as is the low condition of mental power. In a community such as that of the Earlswood Asylum there is to be found every variety of imbecile mind. In fact, just as in the outer world, there is a graduated series from the most commonplace intellects—who are 'the hewers of wood and drawers of water'—up to the giant minds that leave their impress on the age in which they live; so is there among an imbecile population a gradual shading in an inverse direction—from the youth who might, if he had property, become the subject of inquiry before a master in lunacy, to one who, with every means of communication with the external world, except feeling, closed, vegetates in impenetrable mist. In such a community one can perceive the grades of physical condition accompanying the mental phases; and a study of the physical anomalies becomes as interesting and important as that of the psychological state. When contemplating so large a number as that which Earlswood shelters, one is able to set some of the members aside into natural groups, by simple reference to their physical state, and to predicate from that state what will be their probable future mental improvement. There is scarcely an organ in the body but may be found gravely altered in idiots: the circulation and respiration are abnormal; the skin exhibits perturbed functions; defective innervation, lesions of motility and nutrition, are abundantly met with; the bodily conformation is often of an aberrant kind. Regard, therefore, should be paid, in all cases of diagnosis of idiocy, to the physical condition as confirmatory of any opinion based on purely psychological data. It is in this way one is enabled to differentiate an idiot from a simply backward or ill-regulated child. It is from the conviction of the importance of a study of the physiological manifestations of idiocy, that I have been induced to devote no small portion of time to an investigation into the structure and functions of the various organs *seriatim* among idiots and imbeciles. I purpose in the present paper giving some of the results of my observations of the feeble-minded, in reference to the condition and conformation of their mouths. Characteristic as is this region of various transitory mental phases among the sane, does it bear the permanent impress of a state in which the mind has failed in attaining its normal condition? If so, what is the nature of the impress? Does any value attach to the conformation of the mouth as confirmatory or otherwise of a state of mental incapacity? These are some of the questions we have to solve. I may premise that these observations have been made during the past year, without reference to any recent legal inquiry, and extend over 200 cases, which have been taken, without any special selection, from a larger number. Not one on the list would, in his present condition, be able to manage his own affairs, or be legally held to be responsible. Many of them, however, are susceptible of considerable culture, are affected by the amenities of life, write letters to their friends, make small purchases, and form friendships. Several perform mechanical work with system and order. One, although possessing very little judgment, has been taught French and Latin, and reads these languages as well as ordinary schoolboys. Some few possess extraordinary memories and special aptitudes. One hundred and forty-six were males, and 54 females. Their ages ranged from 7 to 36.

"*Palate.*—Among the 200 cases included in this inquiry, 82 possessed palates inordinately arched, and with this increased arching were noticed various abnormities. In some the palate was unsymmetrical, the two sides having different degrees of concavity, or one side plane and the other concave. In 34 the palates were excessively arched, approximating to the appearance of the roof of a house, and with this extreme angularity was great narrowness. Excessive arching of the palate occurred, therefore, in 58 per cent. Excessive flattening of the palate was observed in 4 cases. In 34 cases, or 17 per cent., the palate had a very prominent antero-posterior ridge or keel corresponding to the line of approximation of the palatal bones. In 7 the palate bones did not meet, leaving a sulcus between them, the mucous membrane being, however, continuous. There was no instance of the ordinary cleft palate; and I may remark that, in an examination of nearly 600 idiots, I have failed in meeting with an example of that deformity. In several the hard palate extended but a short distance posteriorly, from defect of the palatal process of the superior maxillary bone and entire absence of the palatal process of the palate bone; and in all these cases the velum palati was unusually flaccid. In the majority of cases there was marked narrowness of the palate.

"Thirty-three per cent. do not exceed 1 inch, and 62 per cent., while being more than 1 inch, do not exceed $1\frac{1}{4}$ inches; whereas the normal average has been stated to be $1\frac{1}{2}$ inches. It is worthy of notice that these numbers hold no direct relation to the age or stature of the patients examined. Thus, in a youth twenty-two years of age, and 6 feet 1 inch in height, so narrow is the palate that there is only 1 2·24th of an inch between the bicuspids, and only 10·24th of an inch between the opposite gums at their widest interval. The lowest measurements occurred in a boy and girl, the boy twelve, and the girl thirteen years of age. Neither is there a direct relation between the width of the palate and the cranial capacity; for in a microcephal whose palate was 22·24th of an inch wide, the internal canthi of the eyes were 23·24th of an inch distant from one another; while in a macrocephal whose palate was 23·24th of an inch wide, the distance between the internal canthi amounted to 2 inches.

"*Teeth.*—The principal characteristics of the teeth in idiots are, that the period of the first dentition is delayed, the second dentition considerably postponed, and that they undergo very general and rapid decay. In many cases the anterior surface of the incisors presents a honeycombed appearance, but in no one instance have I observed those special characters which have been well shown by Mr. Hutchinson to be significant of congenital syphilis. In a large number of cases they are developed irregularly, are crowded, and the canine occupy a different plane from the other teeth—all these irregularities resulting from the imperfect development of the superior maxillary bone. In 6 cases, or 3 per cent., the upper incisors projected to such an extreme degree as to produce grave deformity. In 7 cases, the teeth of the lower jaw were in advance of those of the upper.

"*Tongue.*—The most prevailing character noticeable in the tongue of idiots is the hypertrophy of the fungiform papillæ. Undue prominence of the papillæ was observed in 101 instances. In several there is a marked want of co-ordination in the movements of the tongue, so that the patient, although endeavoring to comply with the request, is unable to protrude it. This condition is usually associated with an absence of general co-ordinated movements, and in the improvement which is effected by treatment it is usually the most persistent derangement of motility. In 16 cases the tongue presented a soddened appearance, and exhibited deep, transverse furrows on its dorsal surface; in all these patients one is able to trace a marked physiological and psychological agreement, and so much do they resemble one another in these respects, that they might readily be taken for members of the same family. Inordinate size occurred in 12 instances, and in almost every case was associated with defective power of articulation. In 2 the tongue was unusually long; 33 were mute, 16 semi-mute. In 83 the speech was indistinct; in 62 the speech was fair. Stammering was observed in 4.

"*Tonsils.*—One cause of the peculiar speech prevailing among idiots is the condition of the tonsils. These observations, for the most part, were made in the summer, when the tonsils were not likely to be rendered worse than their usual condition by climatic influences. In 30 instances they were injected; in 17 slightly enlarged, in 79 considerably enlarged; and in 5 so much increased in size as to interfere with deglutition and respiration.

"*Mucous Membrane, etc.*—Besides the injection of the mucous membrane of the tonsils which has been noticed, other regions of the oral cavity are liable to this condition. The velum palati, uvula, and pillars of the pharynx were found to be thus characterized in 27 instances. The posterior wall of the pharynx was observed to be marked by considerable vascular injection in 33 cases, and in 6 the mucous membrane had assumed a granular appearance. The buccal and labial glands were generally hypertrophied, and the salivary glands were frequently enlarged. In 11 instances the sublingual gland was *greatly* enlarged. The uvula was elongated in 14 cases, bifid in 2, very short in 1, and entirely absent in 1. The lips were hypertrophied in 2. In 1 case only were the gums noticed to be swollen and tumid—a circumstance arising probably from the abundant supply of fresh vegetables with which the patients are provided.

"*Slavering.*—The flow of saliva from the mouth is universally associated, in the popular mind, with the condition of idiocy. The slavering may vary in degree. It may occur only at periods of excitement, and at meal times, or with scarcely any intermission throughout the day, producing, in severe cases, excoriation of the chin. Among 325 cases which I have examined, I find 72, or 22 per cent., in which this habit was noticed. Of these, 28 slaver to a slight extent, 17 rather more so, and 26 in an aggravated degree. This peculiarity depends, I believe, on two or three causes—1st, the increased secretion of saliva; 2d, the deformed condition of the mouth; 3d, the want of co-ordinated movements in the muscles of the tongue; and 4th, the absence of tonicity in the labial muscles. Seeing that slavering exists in 22 per cent. of imbeciles, the question may arise—Is it confined to this section of the community? I am not prepared to say that it is never associated with mental vigor; but I believe that, excluding childhood, old age, disease of the mouth, and neural lesions, slavering is very rarely unconnected with mental imbecility. Moreover, I have examined, with reference to this question, 1000 persons who are doing the everyday work of the world, without meeting with a single example.

"*Summary.*—We have thus seen that idiocy is not simply a cerebral lesion; that it carries with it marked physical deviations, of which I have shown conspicuous examples in the mouth; narrowed, arched, and unsymmetrical palates; tardily developed, irregular, and rapidly decaying teeth; a hyperæmic condition of the mucous membrane and glands; elongated uvulas and hypertrophied tonsils; large, enervated, and rugous tongues, deficient in co-ordinated movements and in their special function; saliva secreted inordinately, and retained incontinently. Such are some of the characteristics of a class in which mental vigor is in abeyance, which should be taken in connection with the psychological state in diagnosis, and inculcate the doctrine that the psychical condition of these unfortunates should be specially sought to be ameliorated by an improvement of their physical condition.—*Abridged from Lancet.* (*Dublin Medical Press.*)

The Sulphuric Ether Patent.—"It will be seen by the following report, that the patent formerly held by Dr. W. T. G. Morton for the exclusive use of ether in surgical operations, has been finally declared to be 'void, and the subject matter not patentable.' We are indebted for this decision to a suit of Dr. Morton, in the U. S. District Court, New York, against the New York Eye Infirmary, for infringement of his rights as patentee, and the question is, it is hoped, now forever at rest. The plaintiff called as witnesses Drs. Wood, Griscom, Barker, Parker, Stansbie, Noyes, and Edwards.

"Dr. West testified that he used ether rather than chloroform. On being asked how many years he had used it, he said he hardly knew whether he ought to answer the question, as he might implicate himself in a suit, as this appeared to be the beginning of suits against the profession. Mr. Cozzens, the plaintiff's attorney, said they were ready to stipulate on the record that no advantage should be taken hereafter of the answers given by any of the witnesses. The witness then said he had always used it since Dr. Morton made it known. He described the mode of its administration, and what kind of cases he used it in, the quantities he used, and what were its effects. He did not use the machine described in the specification of the patent. Being asked what value was now-a-days attached to its use in surgery, he said he did not think language could express it—but by this he afterward said he did not mean monetary value, but benefit to the human race.

"Dr. Griscom testified to nearly the same things. To the question as to its value, he said it would depend upon circumstances. If the operation was necessary, and could not be performed without ether, it was worth to the individual as much as his eyesight; but he could put no monetary value upon it. As to the proportion of surgical operations in which ether or chloroform was used, he could not say.

"Dr. Barker's testimony was to the same effect. He also testified to the general use of ether in surgery, both in New York and Connecticut, where he formerly practiced.

"Dr. Willard Parker went over nearly the same ground, saying it was of great value to the patient, but no extra charge was made for it by the surgeon; that it was entirely impossible to fix any value upon it, there being no standard to go by. If the thing were wiped out now, and could be brought back again by paying millions, millions would be paid. He further proved, on cross-examination, the general use of the article over the country, and said that Dr. Morton came to him in 1856 or 1857, and brought letters from physicians and surgeons in Boston; that he was aware of the subject, and aware of its being patented; and of course there was a prejudice in the profession against patentees, or having anything to do with them. Witness proceeded—I had a conversation with Morton about it, and he said that he had abandoned the patent, and was now throwing himself upon the humanity of the world; I then took him cordially by the hand, and introduced him to a large number of gentlemen in the profession; he made a statement at a meeting we had of what he had gone through with, and of his purpose with regard to the patent, and explained about a suit which had been commenced against the Chelsea Hospital; measures were taken by the profession here to raise funds for him; the New York Hospital paid him $500, and Bellevue $1500; I went down to South Street and raised several hundred dollars on the ground that he was a benefactor to the world. This was done on the idea that he had abandoned his patent; otherwise not a thing would have been done.

"*Re-direct.*—I would not, because he was shielding himself under another garb; he had his patent to protect him, and we should have left him to that; don't know whether Bellevue Hospital purchased a license to use it with the $1500.

"Other witnesses testified as to the amount of ether used by defendants; as to the number of cases in which it had been used, no certain testimony could be obtained.

"Judge Shipman finally said that the patent had got to be discussed some time or other, and might as well be, before putting in any further testimony. The points as to the validity of the patent were then discussed at length by counsel on both sides. The Judge this morning (Jan. 30th) announced that he had come to the conclusion that the patent was void, and that the subject matter, under the circumstances, was not patentable. He therefore directed the jury to find a verdict for the defendants."—(*Boston Med. and Surg. Journal.*)

MISCELLANY.

In treating of the relations between the body and mind, a writer in the *Med. Critic and Psychological Jour.* makes the following observations upon the facial characteristics of idiocy: "Were the proposition advanced categorically, that a certain contour, not the physiognomy, of the countenance was associated with idiotic and weak mind, it would be received with incredulity, or the coincidence would be referred to that general deformity which characterizes this class of beings. But this is true, not only as a general law, but there exists a strong probability that different forms of face distinguish separate classes of idiots; that there is the round-visaged idiot, the general contour of whose features and whose eyes and mouth are circular, who is dwarfish, obese, and rotund; and the oblong-visaged idiot, whose features are elongated, gibbous, and acute, and whose frame is gracile and attenuated. The teeth decay prematurely in these individuals; they are diminutive or disproportioned in size, and irregularly set. There is often present the cleft lip of the scrofulous child; and, what is more marked and permanent, although until lately it escaped observation, the cleft, the vaulted, the carinated, or the conical palate. Such features acquire their true importance and their relation to psychology, when viewed as parts and proofs of that malformation or arrest of development which involves or influences the nervous system, and upon which congenital idiocy so often depends."

In a valuable record of some observations on the influence of railway traveling upon health, in the *Lancet*, the reporter states that the disorders he has found "most commonly excited by the influence of cold in railway traveling, are the various catarrhal affections of the respiratory organs, sore throats, earache, toothache, pleurisy, pneumonia, and various forms of rheumatism, particularly lumbago and sciatica. It is very remarkable how many cases of serious pulmonary disease in my experience have dated their origin to cold caught in railway traveling."

In the course of an instructive lecture on the effects of gold and its preparations upon the animal organism, in the *Amer. Med. Times*, Dr. Saml. R. Percy observes that "in moderate doses the salts of gold produce an increased fullness and frequency of the pulse, an improved appetite, and an augmented action of the skin. They stimulate the nervous system, increase the mental energy, and after a time produce decided aphrodisiac effects. They largely increase the secretion from the salivary glands, although they do not produce the sore mouth and the fetor that is produced by mercury."

In his quarterly report on physiology, in the *Amer. Med. Monthly*, Prof. R. C. Stiles thus notices some observations on the etiology of neuralgia: "Another instance of the value of accurate observation on the pathological anatomy of nervous disorders follows the case of M. Bourdon in the *Archives*. A case of violent and rebellious neuralgic pain of long duration was found, on microscopic examination, to be accompanied by a fibrous growth of new formation, a diffused neuroma among the peripheral branches of the affected nerves. Extirpation of the affected part was followed by immediate recovery."

In the report of the proceedings of the Manchester Literary and Philosophical Society, in the *Chemical News*, an abstract is given of some experiments on amalgams, by J. P. Joule, LL.D., in which it is stated that "by precipitating copper on mercury electrolytically, a mass of crystals is gradually formed. After a certain time the crystals begin to get fringed with pink, indicating uncombined copper. In this state the amalgam is found to be nearly a binary compound. On applying strong pressure to an amalgam containing excess of mercury, the latter is driven off leaving a hard mass composed of equivalents of the metals. If, however, the pressure be continued for a long time, the resulting amalgam contains more than one equivalent of copper, indicating a partial decomposition. The author gave an account of his experiments with amalgams of silver, platinum, lead, zinc, and tin. In the case of the latter amalgam, long-continued pressure drives off nearly the whole of the mercury, indicating in a striking manner the efficacy of mechanical means to overcome feeble chemical affinities."

The *American Druggists' Circular* says that "a method for preparing common clay for crucibles or fire-proof material generally has lately been patented in England by Bower. The fusibility of common clay being owing to its containing more or less of the oxyds of iron, as well as lime and magnesia, by removing these bases with hydrochloric acid, a much more refractory material is obtained. The very same process was, however, published in 1847, by Mr. Gaffard, in *L'Institut*, No. 594, and *Dingler's Journal*, vol. 104. Crucibles made from such prepared clay suffer the temperature of fused wrought-iron without softening."

In the course of some remarks on the physiological relations of sugar, a contemporary thus refers to certain facts connected with its supposed influence upon the teeth: "Sugar lies under a ban for injuring the teeth; but the negroes employed on sugar plantations, who eat, perhaps, more sugar than any other class of people, have almost proverbially fine, white, sound teeth, which they retain in old age. But, on the other hand, in England, persons employed in the sugar refineries, who are from their occupation obliged constantly to be tasting sugar, lose their teeth from decay after a few years. Sugar in combination with a small amount of alkali has the property of dissolving phosphate of lime, which is contained in large quantities in the bone and teeth; a circumstance which may explain in some measure the contradictory nature of the facts."

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, APRIL, 1862. No. 9.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

We propose to give a few chapters on Plugging Forceps, as we are quite sure many operators will render them useful in many difficult as well as simple cases. *Power* is essential to make a good plug, and it cannot be applied in many positions in the mouth, although the cavities in themselves are simple enough to fill. Some operators think that if they exert all their strength in plugging a tooth that it is necessarily done well. This is not so. It is a fact that some dentists cannot, or at least they do not, plug molar and bicuspid teeth well on the back parts. There are two reasons for this, perhaps; one is that few can give that kind of *shape* in those localities to cavities, and another that the gold is not condensed as they think it is. The more defective the hold a cavity has on a plug the sooner it will fall out; a very hard plug, strongly embracing the walls of a cavity, is much more reliable. Besides, we cannot always shape a cavity as we please; and hence it is necessary that we must make up for it by *hard pressure*.

About three years since a lady called to see us in relation to her teeth; they had a good many plugs in them, and most beautifully done. We remarked, That they were elegant. She said, Not so very, as the plugs are all coming out. Upon further examination, we found that five plugs had fallen out from the back parts of the molar teeth. We replaced them, and made the final consolidation with the forceps.

The same kind of thing occurred the day before writing this paper. A lady patient could not wait for us, six months since, just before going on a journey, and called on another dentist and had a number of teeth plugged. Some of them came out. She called on us, as above stated; we saw she had a number of teeth plugged, and nicely, too. We re marked, Why, here is a good deal of work we did not do. Who did it? Dr. ——, and no thanks to him. Why, it is good work, we said. Look a little further, and you will see, she remarked. We did so, and found that two plugs had fallen from the back parts of the two superior bicuspids. We refilled them, and consolidated the plugs with the forceps. We have cited these to illustrate. They are, however, but a few out of thousands which have occurred during our practice.

We do not presume that the plugging forceps will be required where crystal foil is used. This foil is very good when it can be kept dry during the packing of the entire plug. It is also useful for building up teeth when that is desirable. For general purposes we use the ordinary foil, as it can be employed more rapidly; but it requires more skill and more force than the former. Fig. 1 represents a drawing of one of a pair of rights and lefts. This instrument is six inches long; the handles are compressed three inches from the beaks, so that they will not be cumbersome in the mouth; one beak is flat, with a copper nail riveted into it; the other beak is smaller, and slightly curved, terminating like an ordinary condensing plugger with a serrated point. These forceps are used for plugging the buccal cavities of the inferior molars, and, in some cases, the superior molars. Fig. 2 represents one of a pair of rights and lefts also, five and a half inches long, not quite so heavy in structure as the last described. The beaks are flatter. They can be used also for the places referred to above; but they are principally used for the anterior and posterior surfaces of the inferior molars and bicuspids, and wherever the ingenuity of the operator can apply them. They save a great deal of labor to the dentist, and distress of prolonged operating on the part of the patient where power is required. They are, in reality, *iron-clad fingers.*

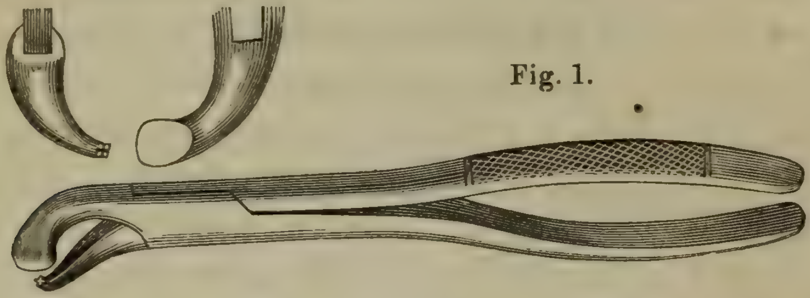

Fig. 1.

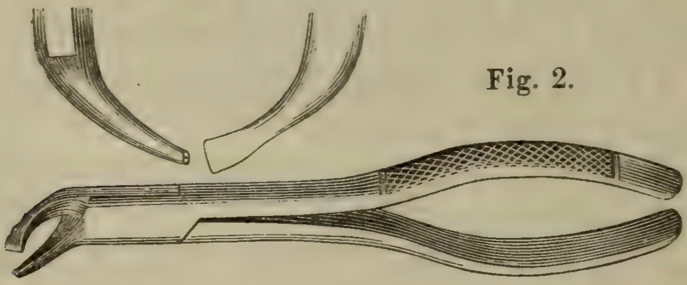

Fig. 2.

We have promised Dr. S. S. White, if he will get them up properly, that we will *inspect* them before they go out to the profession, so that the full value of them may, perhaps, be better understood, as everything depends upon their nice construction, which we cannot describe. That will be for him, however, to say.

(To be continued.)

ARSENICAL TREATMENT OF DISEASED TEETH AND GUMS.

BY W. H. ATKINSON, M.D.

THE ambiguity and discrepancy of opinions respecting this very convenient destroyer of vitality of troublesome pulps, like other mysticisms, must be met with clear synthetic and analytic conceptions, not only of the chemical character of the agent itself, but also comprehensive and accurate knowledge of the differing degrees of vitality resident in the tissues to which we propose to make the application. It is here, as elsewhere, puerile to tarry in the mere detail of formulæ and individual experiences, when the whole field of rational science is open before us in which to attain and then prove to others the knowledge of the modus operandi of agents that act upon the living structures.

In chemical action, this agent is rapidly destructive of albuminous tissues. Looseness of texture facilitates its action, while density of structure retards its combining therewith. Other conditions markedly modify the play of affinities, moisture favoring and dryness precluding combinations. The arsenious acid must dissolve before it can be capable of combining with the albumen, forming arsenicate of this substance, which is itself soluble in a menstruum of arsenious acid and water; and thus in debilitated, lax constitutions, where aqueous lymph predominates, may continue to penetrate deeper and deeper into the tissues just so long as the whole of the acid is not reduced to an innocuous substance by thus forming the albuminous compound. This is the grand reason and necessity for using only so much as may serve to convert the part desired to be destroyed into an arsenicate, that no mischief may be done beyond the necessary limit to effect salutary purposes.

The rapidity with which the action takes place is also a great modifier of results; for when dry or pasty arsenic is inclosed within a pellicle of its true equivalent of the acid and the albumen, there is no further chance for solution of the remaining arsenious acid, and therefore it may remain indefinitely thus isolated without manifesting its presence. But let this cyst be broken by any means, so that a solvent may be brought in contact with the acid, and you will have the specific action at once set up.

This encysting process is liable to take place in constitutions whose blood is rich in fibrin and albumen, and doubtless accounts for the very diverse opinions extant upon the propriety or impropriety of using this powerful agent—heroically on the one hand, and in discarding it wholly by the tender and timid on the other.

Crimination and recrimination as to remedies and modes of practice is, at best, but folly; and hence we had better favorably judge or set down our differences where men of equal intelligence and experience do not agree, as "*res sub judice*," (things held under judgment,) until satisfactory explanation is attained.

I know an old practicing dentist who sports an M.D., who puts as much arsenic, as the bottom of the cavity of decay will hold, into it, seals it up, and tells his patient that the nerve will "drop out" in the course of time. I know others who are so timid and so ignorant of the mode of operation of this agent, (and most others,) that they use only enough to set up a high degree of vascular excitement in the pulp and the periosteal membranes of the organs to which the application is made; and is it any wonder that they have poor success in saving teeth so treated with arsenic to destroy sensitiveness of dentine or exposed pulps? And such boldly acknowledge that they "have made many blunders and expect to make many more in the practice of a profession in which they can do as well as their neighbors;" and very paternally warn the younger members of the profession to "put no confidence" in any man who plainly asserts that he has had better success and can repeat the superiority of scientific certainty of practice based upon principle whenever opportunity presents!

In the cases where too little is used, the arsenicate is not formed, because the solution of the acid in the aqueous lymph is too weak to act upon the albuminous fibrin, constituting a solid of it; and hence is carried by the circulatory apparatus as far as the foramen of the fang and throughout the plasm, circulating in the dentinal tubules, from whose distal ends it makes its way into the lacunæ of the cement, and thence into periosteum and the blood-vessels proper, just without this last tissue, poisoning the capillary structures so as to set up a very troublesome form of periostitis, which will be destructive of the connections of the tooth if not promptly and intelligently treated.

The gums are under the same laws of affinity as the other tissues containing albumen and watery fluids, and, therefore, it will be but reasonable to infer (that which actually occurs) that dense, well-vitalized gums may be destroyed almost with impunity to the surrounding soft parts, while soft, loose gums, sometimes called scrofulous, will be very likely to behave very badly under arsenical treatment, if not very judiciously used. Here, as elsewhere, honesty and independent intelligence are the prime requisites to a successful practice.

The more rapidly the tissue can be charged with a strong solution of the arsenical salt, the less painful will the process of destruction be. And the converse of this proposition also holds good, viz., the slower the process and weaker (within given limit of strength) the solution, the more certain may we be that we will have unsatisfactory and tedious results, usually necessitating the loss of the tooth, if not also the alveolus in which it is imbedded.

The treatment advocated by Dr. J. D. White, to loosen rigid roots of strong teeth which have had their crowns broken off, no doubt will prove generally successful in his own hands, simply because he well knows how to diagnosticate the cases to which such treatment is applicable. And they are governed by the law of density of structure I have tried to set forth in this paper, as the great thing to comprehend before resorting to such use of arsenious acid to living important parts. But woe be to the novice in diagnosis who rashly applies this remedy in incompatible cases. I would say to those who are in doubt about the nature of constitutional habit of patient, that it will be well to err on the safe side, and adopt a less heroic remedy until able fully to discriminate.

We should in every profession and calling in life be willing that those who come after us may profit by our experiences. But to enable them to do this, we must not fail to hold up our failures to attain results desired and sought, quite as fully as to delineate how marvelously acute we had always been in our happy experiences in "never failing to accomplish all we attempted."

Permit me, then, to state, as the result of my failures and successes, conjoined to teach me the principle on which it acts, that arsenic is, when intelligently used, unparalleled in usefulness, but in injudicious hands a very destructive agent of tissues and dental reputations.

New York, February 21, 1862.

SOLDER FROM GOLD FILINGS.

BY JACOB P. FULLER.

If this item is worthy of a place in your journal, please insert it. I presume some brother dentist, farther advanced than your humble servant, has put it before the profession ere this; if not, it may be to the workman of the laboratory an item he may solicit with pleasure.

Take the gold filings which accumulate in your drawers from plates of different standards of fineness, put them in a crucible, fuse and roll in the ordinary way, and it is fit for use. It may be used to great advantage in connection with eighteen-carat gold plate, but not with lining plates of lower denominations. This solder requires a greater amount of heat to fuse it, than the usual eighteen-carat solder used by the profession. These are the advantageous merits it has over other gold solders used for such purposes: this solder cannot be used with such a great advantage unless you line your teeth separate from the plate; it is also suitable for soldering on clasps. It should be remembered, when fusing the above, not to let it remain long in the furnace after it has fused; should you do so, it would have the tendency to burn out the baser metals, which would leave the alloy unfit for soldering purposes.

CHICAGO, March, 1862.

VULCANITE WORK.

BY GEO. B. SNOW.

THERE may be some of the readers of the DENTAL COSMOS, who use the vulcanite base, who would be glad to hear of a means of ascertaining the exact quantity of rubber which would be necessary for a certain case. I have used the following process during the past three months, and would recommend it as an excellent substitute for "guess work." I use sheet wax instead of gutta-percha, and am thus enabled to form my model plate entirely of one substance. On taking this wax plate from the mould, preparatory to packing the rubber, I strip off the thick foil which covers its palatal side, and weigh the wax; being careful to save all of it that was in the mould. I then place the wax on the same side of the scales with the weights, and balance them with rubber. This is of course twice the weight of the wax, which I have found to be an equal amount in bulk. It is as well to add three or four grains more of rubber; but it will nearly always be found in the gateways. If both parts of the flask are thoroughly warmed before they are packed, they can generally be brought together without the further application of heat.

Those who use the sheet gutta-percha can arrive at the same result by partially filling a very narrow glass vessel with water, and noting how much the level of the water is raised by submerging the plate. An amount of rubber sufficient to raise the water to the same level will suffice to fill the mould. Care must be taken, in this process, not to lose any of the water.

HORNELLSVILLE, N. Y., March, 1862.

WHO WILL ANSWER?

WILL some of your experienced subscribers give me, through the DENTAL COSMOS, more light on the following subjects, viz.: First. The best and most expeditious manner of finishing a filling when in the buccal or labial surface of a tooth, and wholly or partially under the margin of the gum. Second. The best method of "renovating" beeswax.

NOVICE.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of March 11th, 1862, at eight o'clock.

President, Dr. Buckingham, in the Chair.

Present, Drs. Flagg, Kingsbury, McQuillen, Githens, Garretson, Peirce, Dixon, D. Roberts, Ellis, H. M. White, Bailey, Griffith, Coe, Hastings, Smith, and Barker.

The subject for consideration was stated to be

"THE USES OF ARSENIOUS ACID IN DENTISTRY."

Dr. Flagg said that, having proposed the subject before the Association, it became his duty, as a matter of form, to make the opening remarks. He wished, however, to do so without absolutely beginning the *discussion proper*, preferring to present the views which had occurred to him as to a method of consecutively treating "arsenious acid" so as to obtain a result widely different from the usual mere statements of practice, which had heretofore been the sum total of society or individual efforts. He considered arsenious acid to be the most important article in the dental pharmacopœia, inasmuch as its effects enabled the dentist to achieve far more in conservative operating than any other one thing. He desired that it should be remembered that from the moment when the first successful result was obtained, by Dr. John R. Spooner, it had taken a rank among agents which it had maintained to the present day; that in this it seemed a like inspiration with the offering of virus for vaccination, and sulphuric ether for the induction of anæsthesia—and that, on this account, it deserved the most careful and thorough consideration of every practitioner.

He then spoke of the deficiency which existed as to well-substantiated theories of its manner of accomplishing its purpose, as well as the diversity of practice which existed among even the well-informed of the profession, referring to an article which had recently appeared in the DENTAL COSMOS, in relation to this point, from the pen of Dr. G. W. Ellis, and differing decidedly from the opinion which had been advanced in the same number of that journal as to the propriety of considering the thesis of Dr. J. D. White as satisfactorily answering the demand for information in this direction.

He wished to hear the subject of arsenious acid regularly spoken upon without regard to any attempt at concluding so important a matter in the present evening's discussion, and, if he might be permitted, would suggest that gentlemen most conversant with the *substance* itself should introduce the chemistry relating to it, and thus having, as it were, presented something tangible to the members, others most familiar with its introduction to dentistry should follow with such information as they deemed of interest. It would then, he thought, be in course that theory and practice should follow, and he hoped that something more than the proportion of a grain which would destroy a pulp, and the time required for doing it, would be arrived at as a result. He wished the ideas of the members as to how it acted, what it did, its advantages or disadvantages in combination, its dangers, etc., how prognosed and how obviated, together with practical experiments, if possible, in elucidation of views—trusting, in conclusion, that the members might each and all derive both interest and instruction, not only from listening, but by speaking. He proposed that the President, Dr. Buckingham, as Professor of Chemistry, should take the initiative in the discussion.

Dr. Buckingham referred to the publication of a work by Dr. Spooner, of New York, it being the first published account of the use of arsenious acid for the destruction of the dental pulp, and also spoke of an article published in the *Baltimore Journal*, March, 1842, by Dr. W. E. Ide, of Zanesville, Ohio, in which he recommended arsenic, morphia, and creosote. He says:—

> "In our first experiments we used simply three parts of arsenic and one of acetate or sulphate of morphia, and, contrary to our expectations, in nearly all cases where the nerve was much exposed the application was attended by a considerable amount of pain. When the nervous pulp of a molar tooth was denuded and inflamed, the pain was often excruciating. More recently we have used equal parts of arsenic and morphine. A small quantity of this, say the fifteenth or twentieth of a grain, is sprinkled on a piece of cotton that has previously been saturated with creosote, and carefully applied to the exposed nerve after as much of the foreign matter as practical has been cautiously removed from its surface. Over this white wax is to be applied in a manner to prevent pressure, and the whole permitted to remain five or six hours."

It appears, from the published statements, that very nearly the same formula was used in 1842 that is in use at the present time. He (Dr. Buckingham) had used it in various ways—sometimes used the pure arsenious acid, wetting a piece of cotton with water, then taking up on it about the thirtieth or fortieth of a grain of the acid, applying it to the pulp and covering it so as to confine it in the cavity for about twenty-four hours. At other times had tried the acid wet with creosote, and again the acid and morphia mixed with water or some of the essential oils; but preferred the formula of arsenious acid and sulphate of morphia, equal parts, (by weight,) made into a paste with creosote. He used the paste very thick, sometimes so stiff that it could be made into pellets, forming one about the size of a pin's head, which he would take up on the point of a plugger and place directly on the exposed pulp. Formerly confined the application in the tooth with wax; but recently has used cotton saturated with gum sandarach, dissolved in alcohol.

The substance used for destroying the pulp was frequently called arsenic; but this is incorrect, as it is not arsenic, but a compound of that metal with oxygen—there being one equivalent of arsenic united with three equivalents of oxygen, AsO_3—it being denominated arsenious acid, or, as sometimes called, the white oxide of arsenic. There is another compound of the metal with oxygen called arsenic acid, AsO_5; but this is not used either in dentistry or medicine. The metallic arsenic can easily be obtained from the arsenious acid by heating it in a glass tube, with twice its weight of black flux. The metal will be sublimed and deposited on the sides of the tube, presenting a metallic appearance of a steel-gray color.

Arsenic combines with many of the metals, and the alloys are usually hard and brittle. Very few of these are used, except the one with lead. Shot contains about one per cent. of arsenic, and causes the grains to assume a more spherical form, and makes them much harder than they would be were it not present.

In regard to the manner of its action on animal tissue, there is much difference of opinion. We know that it destroys vitality when applied in sufficient quantity to any part; but of its method of action we know very little. It does not act as a true escharotic; for they chemically combine with one of the elements of the tissue, destroying its chemical composition, and death follows as a consequence. Arsenious acid does not, however, decompose animal tissue; on the contrary, it preserves it. The stomach of a person who has been poisoned with it, does not decompose as rapidly as those who die by other causes. Anatomical preparations may be kept in a solution of it; and the skins of animals and birds are sprinkled with it to prevent their decomposition.

He did not think it formed a definite compound with any of the constituents of animal tissue; if it did, they were not in any way changed in their appearance. Nor did he think that when the arsenious acid had destroyed the vitality of one part, it left that part to attack and destroy others, as has been stated in some of the books. If this was the case, when once the smallest portion had entered the system, the whole structure would eventually be affected.

The influence of arsenious acid is always in proportion to the quantity taken, when the amount is not sufficient to destroy the life of the person. It does not, like some animal poisons, multiply itself; thus the very smallest portion of the virus of the small-pox will inoculate the whole system of persons who have not been affected by it, or who have not been protected by vaccination. Many other animal poisons act in the same way; but arsenious acid is eliminated by the excretory organs. When the amount is more than is required to destroy life, the extra quantity may be disposed of in various ways; it may be dissolved in some of the fluids, or may remain in a solid state in the stomach. Arsenious acid, he thought, when taken in poisonous doses, might destroy life in one or the other of two ways. It would first destroy the vitality of the parts with which it came in contact, and, inflammation being induced to throw off the dead tissue, death might ensue from the inflammatory action; or it may be dissolved in the fluids of the stomach, and, passing into the circulation of the blood, produce its destructive action on that fluid. We have sufficient evidence to prove that it can be absorbed even when applied externally. Numerous cases are recorded where it has produced all the symptoms of poisoning from the external application; other cases are also mentioned, where it has been applied in large quantities, without any unpleasant effects. The only way these different results are explained is that, in the first case, it is thought the poison, if applied in small quantities and to healthy tissue, is absorbed and carried at once into the circulation; while in the other, the large quantity used destroys the vitality before it has had time to be absorbed. This last result is more likely to follow when the vitality of the part has been reduced by disease, as in tumors or ulcers. When the external part is dead, it protects the surrounding tissue from the poison.

With regard to the question, how does arsenious acid act when applied to the exposed and inflamed pulp of a tooth? he had no doubt but it destroyed the vitality without being absorbed by the other parts; but when the pulp is in a healthy state there was a portion probably carried into the general circulation; the quantity would, however, be so very small that it could produce no visible effect upon the system. Dr. Pearson says, the one-sixteenth of a grain of arsenic is as harmless as a glass of wine. The average dose of arsenious acid is the one-tenth of a grain, three times a day; and it has, sometimes, to be continued three or four months before it produces the specific effect desired.

It is said that in some parts of Austria some of the inhabitants take it to obtain a fresh, healthy appearance; but when the practice is once commenced, it must be continued, and they suffer terribly if deprived of it even for a short time.

Dr. Kingsbury stated that he considered the subject for the evening's discussion was of more than ordinary importance, as he regarded "*The Uses of Arsenious Acid in Dentistry*" as being invested with special interest to every member of our profession, and worthy of their most thorough investigation.

Native arsenious acid has been found in various localities; at Andreasberg, Bohemia, and other places. The arsenious acid of commerce (the common white arsenic) is mostly found in combination with other metals, as cobalt, nickel, tin, and iron, and is prepared on an extensive scale in Cornwall, Saxony, Silesia, and Bohemia. This valuable mineral oxide seems to have been known to the pioneers in the healing art; and is mentioned by Geber, and was used by Hippocrates as a topical remedy in the form of *orpiment* and *realgar*. It is capable of crystallization, the usual form of the crystals being regular octohedrons, sometimes tetrahedrons. It is slightly soluble in water, but alcohol and the essential oils dissolve it readily.

The physiological effects of arsenious acid are of the most striking character. It has been demonstrated by the experiments of Jager and others that it acts as a deadly poison even upon the vegetable as well as the animal kingdom. Seeds that have been soaked in a strong solution of arsenious acid are incapable of germination, while buds that have been plunged in the solution are no longer capable of expansion. If roots or stems of plants or trees be immersed in it they invariably perish. But while it proves thus destructive to all the higher, and most of the lower families of plants, we find some most remarkable exceptions in algaceous plants, of the *genus hygrocrocis*, which grow luxuriantly in a solution of arsenious acid, the vegetable filaments being intermixed with the crystals of arsenic.

In the animal kingdom there has been found, as yet, no exception to its fatal power as a poison, from the infusoria up to man. Death from this agent is preceded by inordinate actions and increased evacuations, especially from the mucous membranes. When taken in small doses of from one-sixteenth to one-twelfth of a grain, it has been regarded by some as a tonic; and its use has been strongly advocated to improve the appetite, invigorate digestion, promote assimilation and secretion, and stimulate the nervous and muscular functions. In proof of the beneficial effects to be derived from its use, we are informed that the inhabitants of Upper Styria use it as a condiment, and take as much as two grains daily. But those who are best qualified to give an opinion, state that arsenious acid, even taken in long-continued small doses, is followed by a gradual sinking of the powers of life. The symptoms produced by excessive or poisonous doses, though not invariably the same, are known to you to be of the most distressing character. From two to ten grains, when kept on the stomach, produce nausea and vomiting very soon after the poison has been swallowed, attended with a sense of burning pain in the throat and stomach. There is a feeling of dryness and constriction of the throat, attended with insatiable thirst and difficulty of deglutition. The pulse is quick, feeble, and irregular; respiration becomes laborious and painful, accompanied with cold, clammy sweats; tremblings and cramps seize upon the limbs; delirium, convulsions, tetanus, and coma, supervene; and death usually closes the sufferings of the patient in from four hours to three days after the administration of the poison. The best antidote that has been discovered is the hydrated sesquioxide of iron. In thirty-one cases (recorded by Dr. S. R. Beck) in which it was given, recovery took place in twenty-nine. In the other two cases the antidote could not be retained on the stomach.

The application of arsenious acid in dentistry, for the purpose of destroying the dental pulp, is comparatively of recent date. Its value for this purpose was first discovered and tested by Dr. John R. Spooner, of Montreal, and was first published to the world by his brother, Dr. S. Spooner, of New York.

Dr. Kingsbury then read the following from Dr. Spooner's work, entitled Guide to Sound Teeth, by Shearjashub Spooner, M.D. New York: Wiley & Long, 161 Broadway, 1836:—

"When decay has extended to the nerve, and causes the tooth to ache, extraction is the usual remedy resorted to by all who have sufficient resolution to induce them to undergo the operation. The teeth are so liable to caries in this country, and often decay at so early an age, and so rapidly, that it is a matter of very great importance to all, especially to those who have been so unfortunate as to lose many teeth, whether some means cannot be devised for their preservation.

"'When the nerve of a tooth has been so much exposed by decay as to leave no hope of curing it but by extraction, it were much to be desired that medical science should lead to the discovery of some principle that would quickly extirpate fleshy substances, or at least their diseases, without at the same time acting on the bony structure of the teeth.' —*System of the Treatment of the Diseases of the Teeth*, by J. P. Clark, A.B., page 89.

"This desideratum has been happily discovered, and its success has been thoroughly tested in a practice of many years. *The nerves of the teeth may be certainly and effectually destroyed, with little or no pain to the patient, and without the least danger, by means of a little arsenious acid, (arsenic, ratsbane,) applied to the nerve.*

"We claim for our brother, Dr. J. R. Spooner, of Montreal, the credit of this invaluable discovery, and for ourselves no small share of credit for thus frankly laying it before the dental profession and the public.

"We have proved that the vitality of the fangs of the teeth, which is necessary to prevent them from acting as foreign bodies in their sockets, does not depend upon the internal membrane or nerve, (see page 57.) This fact is of greater importance than one would suppose at first view, for thousands of aching teeth which are daily being extracted, may be effectually preserved by taking advantage of it. This is a matter of much moment to those who have been so unfortunate as to lose many teeth.

"So complete and satisfactory is the operation of arsenic in destroying the living fibre that, instead of extracting teeth whenever the nerve is badly exposed, we destroy it, plug the teeth, and thus preserve them. Teeth thus treated will often last a great number of years, and prove highly serviceable.

"Arsenic will not only positively destroy the nerves of the teeth, but it possesses the great advantage that it does this without causing pain! If it be applied to an aching tooth, it slightly augments the pain, but when applied to a nerve not inflamed, it does not cause any pain worth minding! Of late we have applied to aching teeth, a mixture composed of arsenic three parts, and acetate of morphine one part, the morphine (one of the active principles of opium) being the most powerful odontalgic remedy (remedy for the toothache) that we know of. Thus the most violent toothache may be effectually cured without additional pain, a circumstance well worth considering. We cannot too strongly recommend this treatment to the public, under the circumstances we are treating of. No selfish views evidently actuate us in making these declarations. They are not the puffs of pretenders. They are not involved in mystery, but we explain the whole. 'The royal mineral succedanium,' involved in the mystery of empiricism, a worthless thing, excited great curiosity in New York last year. We doubt much if this truly valuable discovery will excite any interest; hence we are a little anxious to urge it.

"Arsenic is the only substance with which we are acquainted that will effectually destroy the nerve of a tooth. Nitric acid and nitrate of silver (lunar caustic) have been much employed for this purpose. They were favorite toothache remedies with Hunter and Abernethy, but they do not generally do this effectually; they only destroy the surface of the nerve, indeed, but the small portion of it exposed; besides, they destroy the tooth. A hot wire is the remains of barbarism, cruel as death, and does not become the present enlightened day.

"A drill, as well as the hot iron, is very painful, and is enough to strike horror to the soul of a patient. The arsenic effects the object like a charm, and under proper management never fails of complete success. Many persons of course would be apprehensive of danger from its use; the eighth of a grain of arsenic is a common dose in medicine; the twentieth of a grain is quite enough to destroy the nerve of any tooth. But let no ignorant person dabble with this remedy. As we recommend it so strongly, it is a duty incumbent on us to caution the public. There are many who would have no hesitation in filling a large hollow tooth with arsenic, on the strength of this recommendation. There are some who do not even know what it is! We know of one instance, and but one, thank Heaven, in which the application of the remedy was attended with fatal consequences, and we merely mention it as a warning to presuming quacks.

"A man having a violent toothache applied to an ignoramus for relief, who, having heard that arsenic would destroy the nerve, proceeded to fill the tooth, which was very much decayed, with this substance, and did not properly confine it. The man returned home; the pain continuing, he took a hearty dram; the arsenic was swallowed and the man poisoned.

"We have used this remedy in hundreds of instances, without ever experiencing any ill effects; nor can any danger ever attend its proper application."

Here we have the original publication on the use of this valuable agent in dental practice. It must be conceded by all that the man who made the discovery, and introduced it to the profession, has conferred a lasting benefit upon the world, and justly deserves to be ranked, as a real benefactor of his race, with such men as Jenner, the author of "*vaccination*," and Wells, the discoverer of "*anæsthesia*"—men of immortal fame!

Although Dr. S. long since ceased from his earthly labors and went to the "undiscovered country from whose bourn no traveler returns," he has bequeathed a rich inheritance to the professional brethren he has left behind;

yet, like many other most worthy contributors to art and science, he has never received the distinction and honor he justly merited. It appears he was in search of an agent that would effect the destruction of the dental pulp upon an entirely different principle from any known to the profession at that time—an agent that would quickly produce the extirpation of the soft tissue without injury to the bony structure, and without the excruciating pain induced by the actual cautery. The idea of applying arsenious acid for this purpose was most fortunate; and he might well have exclaimed, "Eureka! Eureka!" I have found it! I have found it! It was a truly great idea, when we consider the aggregate of human suffering prevented, and of valuable organs preserved, as the fruit of its practical application. Arsenious acid fully meets all that can be required as a topical remedy for exposed nerves in teeth. When properly applied, it acts promptly and effectually, without injury to the dentine, and in most cases without pain.

At the time of its discovery, it was, indeed, the great desideratum in dentistry, not only in this country, but throughout the world. In order to give full value to it, we must consider its relations to fang filling—an operation of the most important character in dental practice, and yet, in most cases, absolutely impracticable without previous treatment of the pulp with arsenious acid. It has stood the tests of science—of friends and foes—for some thirty years, and to-day it stands without a rival Instead of being superseded by any other escharotic, it is constantly gaining the favor and confidence of the profession. Tomes, who some years ago, in his "Lectures on Dental Physiology and Surgery," condemned arsenic as an agent for destroying the dental pulp, and said, "I think arsenic should be struck off our list of dental remedies," in his recent valuable work on "Dental Surgery," after having tried nitrate of silver, chloride of zinc, and other substances to his entire satisfaction, testifies to the value of arsenious acid as follows: "Arsenious acid has, without giving rise to a greater amount of pain, been found to act with more certainty and in less time than any other agent." An honest confession, and one that has been made by many others who opposed it for years as strongly as did Mr. Tomes. It occurred to him that an interesting feature in the discussion of this subject might be presented not only in the first published facts touching the discoverer, but by obtaining and comparing the earliest formulæ for arsenical paste, with those most in vogue at the present time. Dr. K. then read the following formulæ:—

Formula No. 1.—Arsenic, 3 parts;
Acetate of morphia, 1 part.
S. Spooner.

No. 2—Steep a lock of cotton in essence of peppermint, laudanum, or alcohol; then dip a point of the lock in powdered arsenious acid, and apply it in close contact with the pulp.—*J. J. Greenwood.*

No. 3.—Arsenious acid, grs. iij;
Acetate morphia, grs. ij. Misce. *Dr. Ide.*

No. 4.—Arsenic, grs. ix;
Morphia, grs. iij;
Creosote in sufficient quantity to form a paste.

No. 5.—Equal parts of arsenious acid and sulphate of morphia, and creosote, with 3 or 5 times their bulk of conserve of roses.—*Parmly.*

No. 6.—Arsenious acid, grs. xxx;
Morphia sulphus, grs. xx;
Creosote, q. s. Misce. *J. D. White.*

No. 7.—Equal parts, by weight, of arsenious acid and acetate of morphia. Mix them thoroughly together, and keep in a phial, dry. When required for use, moisten a small piece of cotton cambric with creosote, and touch it to the mixed powders, taking up not more than the thirtieth or fortieth part of a grain.—*J. F. B. Flagg.*

Dr. K. remarked that the inference was clear to his mind that Dr. John R. Spooner, in his first experiments with this new agent, used it *uncombined* with any other substance. But it could not have been long before he substituted an *arsenical paste*, composed of arsenious acid, acetate of morphia, and gum-arabic water, according to formula No. 1, contained in the extract just read from the work of his brother, Dr. S. Spooner. In the October number of the *Dental News Letter* for 1853, there may be found an article from the pen of Dr. J. F. B. Flagg, throwing some light on this point. He states that in the year 1834 or 1835, his brother, Dr. J. F. Flagg, of Boston, was on a visit to Montreal, and, meeting Dr. Spooner, learned the use of this material. He further states that "the method of using it at that time was, as now, equal parts by weight of arsenious acid and acetate of morphia." These were held together in form of a pill by means of a solution of gum-arabic. This statement agrees substantially with that recorded by Dr. S. Spooner. There is a slight discrepancy as to the proportions of arsenious acid and morphia; they being equal parts in one case and three to one in the other. Formula No. 1 is, without controversy, the original basis of all the others, and the *arsenious acid* is the *essential* principle that gives value and efficiency to all of them. Formula No. 2, employed with success by Dr. J. J. Greenwood, contained neither morphia nor creosote. Formula No. 3, so highly approved by Dr. Ide, has no creosote. Formula No. 4, which came into his possession in 1839, was one that he had used extensively in his own practice from that time to the present. Formula No. 5, used from the same date by Dr. Parmly, of New York, and Dr. Maynard, of Washington, vary considerably in the proportion of morphia used, and yet have given the highest degree of satisfaction. He could testify from experience concerning the former, and in regard to the latter could present the testimony of Dr. Maynard in a recent communication containing some interesting facts on this subject.

By request of the Association, Dr. Kingsbury read the following letter from Dr. Maynard:—

WASHINGTON, March 6, 1862.

DEAR SIR:—In reply to your favor of the fourth instant, I have to say that I do not find any record on my books of destroying nerves and filling fangs (excepting those cases when a pivot tooth was to be set) earlier than 1840, but am very confident that the first operation of that kind by *my* hand was for Mr. G. W. Cherry, dentist, then a resident of this city, now dead. Knowing the house in which I operated for him, I am sure it must have been while I occupied that house and previous to the 28th of June, 1839. I *suppose* this operation is the one recorded as performed May 20th, 1839. I distinctly recollect that Mr. Cherry suggested the operation to me *as based on his own practice.* He said he had found that by destroying and removing as much of the nerve as he could get at, and "plugging well down" into the fangs, he had been better satisfied than when filling less of the nerve cavity. At his request, simple arsenic was used—what *he* had used—the tooth a right superior cuspidatus. I argued with him that if it was well to "plug well down," it was better to plug *quite* down, and this I did, designing and making the necessary instruments.

Whether I used after this arsenic alone I do not know. But I about this time, perhaps at once, adopted the preparation, advocated, if I mistake not, by Dr. E. Parmly, of equal parts of arsenious acid, sulphate of morphia, and creosote, with three or five times their *bulk* of conserve of roses. This preparation I have used ever since, and see no good reason to change it. Soon after my return from Europe, in 1846, Dr. Westcott, of Syracuse, New York, published in the *American Journal of Dental Science* an account of my mode of proceeding with this preparation, to which I beg to refer you.

I still use this preparation, as I have said, and think Dr. Spooner has never received the honor due him for his discovery, and would be glad to see some action tending to do him justice.

Aside from the use of arsenic—who was the first to fill the nerve cavity? I have good reason to believe that Dr. Hudson, the elder, performed this operation before I was born, on a superior central incisor, for the late Major Barker, some time an officer of the Treasury Department here, but long before a resident of Philadelphia. It was beautifully done—at least thirty-five years before I saw it first, and this was more than twenty years ago. Drs. Harwood and Bemis, of Boston, were very early in this noble field of work, (where so many show their total want of all noble qualities as operators,) and should not be overlooked when this question comes up for discussion. Very respectfully yours,

EDWARD MAYNARD.

DR. KINGSBURY.

Formula No. 6 is taken from Dr. J. D. White's "*Inaugural Thesis*," a paper of much merit, published in 1853. That part of it containing the formula was published as early as 1850, in the July number of the *Dental News Letter.* No. 7 was published by Dr. Flagg, in the article already referred to. As he desired in the discussion of this subject to do full justice to all parties concerned, it would be proper to state that while Dr. Flagg claims to be the first to *use creosote* with the arsenious acid and morphia, Dr. White claims the credit of the *thorough combination* of the three by grinding them together in a glazed mortar. Doubtless both of them deserve some credit in this connection; but let us not forget that the thanks of the profession are chiefly due first to the man who discovered this invaluable agent, and secondly to the person who gave publicity to the discovery. Arsenious acid being readily dissolved in creosote, we find in this active principle a convenient and willing vehicle to convey the deadly agent on its errand of destruction, while the narcotic power of the morphia makes the conquest easy and death certain.

In regard to the "*modus operandi*" of this agent, there exists various opinions, and a degree of doubt and obscurity; but considered we were safe in concluding that the process is of a chemico-vital character. Arsenious acid and creosote have a strong affinity for living tissue; and while they combine chemically with the organic constituents of that part of the dental pulp in immediate contact with them, alterations of vital actions are produced in the subjacent parts, until complete disorganization ensues. Its susceptibility of absorption is a well-established fact, and this property, in connection with its improper and unskillful use, has given rise to much unjust and deep-seated prejudice in former years. It would seem almost unnecessary to enjoin caution in the employment of a substance so generally known to be of the most poisonous nature. His own method of applying the arsenical paste was as follows: After having cleansed out the cavity of decay in the tooth to be treated, and denuded the pulp as effectually as possible without inflicting pain upon the patient, he would take a small portion of the paste upon a ball of cotton the size of a pin's head, and apply it directly to the exposed pulp, and lay over this a small ball of dry cotton; then apply a pledget of cotton saturated in a solution of gum sandarach, being careful to avoid pressure upon the nerve. Allows it to remain from twelve to twenty-four hours, at which time can almost invariably remove the entire pulp without pain. Should the circumstances of the patient prevent a return to his office, he would give special charge to have the paste removed and the cavity thoroughly washed out at the proper time.

Arsenious acid is in common use by some dentists to obtund the sensibility of dentine, and has also been proposed as a topical application to produce sloughing of the soft tissue and necrosis of the alveolar process subjacent to deep-seated fangs, for the purpose of facilitating their extraction. He had seldom had occasion to employ it for the former, and had never as yet called it into requisition for the latter named object, but would suggest that, when used in such cases, the hydrated sesquioxide of iron might prove a valuable antidote.

Dr. Buckingham said, the first published account he had seen of the paste as it is now made, viz., by mixing the materials all together, and keeping them in that state, was by Dr. J. D. White; but the same materials kept separate, and mixed when wanted, had been used for a long time before that statement was published.

In regard to the antidote for arsenic, sesquioxide of iron, it could only act on the free arsenious acid with which it would come in contact. The portion that had been absorbed, the iron would have no effect upon, nor would it restore to life those structures which had been destroyed by the poison.

Dr. McQuillen remarked that all, no doubt, were familiar with the effects of arsenious acid, local and general, upon the human system, viz.: the destruction of the vitality of a *part* to which it has been applied, or of the *entire organism;* few, if any, however, could assert that they knew exactly how it acts. The action of no remedial agency, indeed, appeared to be less agreed upon by therapeutical writers, judging from the contrariety of opinion among them on this subject, and from the following statement presented by Taylor in his work on *Poisons:* "Arsenic is not an *irritant* poison; it does not seem to possess any *corrosive* properties, *i.e.* has no chemical action on animal tissues, and the changes met with in the alimentary canal of a person poisoned by it are referable to the effects of the inflammation excited by the poison, and not to any chemical change."

There was a contradiction of terms in this extract that appeared irreconcilable. He could readily understand that it was not *corrosive*, as, in the language of Taylor, he "had not found that arsenic produces any effect on dead mucous membrane like those poisons which are properly called corrosive;" but how he can speak of inflammation being excited by it, and yet say that it was not an *irritant poison*, appeared incomprehensible.* He would not presume, however, with the limited attention which he had given to the subject, to deny that the position of the eminent toxicologist was untenable. It was possible that the arsenious acid coming in contact with a living tissue may produce molecular death, and the part thus deprived of vitality become a source of irritation to the surrounding tissues, and induce inflammation in them.

To obtain light on this point, he had been engaged recently in some experiments; but as the observations were not sufficiently extended, as yet, he was glad that the suggestion had been made to continue the consideration of the subject over one or two meetings, and trusted that at a subsequent meeting the results of these investigations might be presented in a tangible shape.

It had been remarked by one of the gentlemen who preceded him, that arsenious acid was destructive alike to animal and vegetable life, and that seed dipped in an arsenical solution would not germinate after such treatment. This statement was the reverse of what he had found on record as the result of the observation of others.

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* As an evidence that Taylor is somewhat confused in this statement, he classifies arsenic as an *irritant* poison on page 40 of his work.

In a work which he could not then recall,* it was distinctly stated that the farmers in certain counties in England were in the habit of soaking their grain in arsenical solutions prior to sowing, for the purpose of destroying a worm, whose ravages on the seed were quite extensive, and also of preventing the formation of rust on the plant when grown. The process was reported as being so successful that many hundredweight of arsenious acid were sold to agriculturists for that purpose yearly. Although the seed was so poisonous as not unfrequently to slightly affect the men engaged in sowing it, and to destroy numbers of birds—partridges in particular—that feed on it after sowing, yet the crop raised from the seed was in no way affected by the poison. There was one remarkable circumstance connected with the dead partridges: "Instead of lying prostrate on their sides, as is usually the case with dead birds, they have been found sitting with their heads erect and eyes open, presenting all the semblance of life."

Very strong objections had been urged against the practice, on the ground that the arsenious acid was liable, during heavy rains, to be washed from the fields into brooks and rivers, and so change the water as to produce injurious effect upon the health of persons drinking it.

In conclusion, he remarked that the employment of arsenious acid as an agent for destroying the vitality of the dental pulp was universally recognized by the profession as reliable and safe. There was, however, a diversity of opinion with regard to the length of time demanded to destroy the vitality of the pulp, and that the application may remain in a tooth; some contending that from three to four hours is sufficient, others that it may be left in twenty-four hours, but must then be removed along with the pulp, or very serious results would supervene. A few practitioners, however, contend that, if hermetically sealed in a tooth, the arsenical paste may remain for weeks or months without injury to it or the surrounding tissues. When on a visit to Dr. Westcott, two or three years since, a tooth had been shown him in the mouth of a lady, in which the paste had been applied nearly if not quite a week, and yet there was not the slightest evidence of discoloration or periosteal difficulty. Dr. J. Foster Flagg had also mentioned a case to him in which an arsenical application had remained in a tooth over two months without the supervention of unpleasant results. This was not designed by the doctor, but due to the patient leaving town unexpectedly, and going in a direction where it was impossible to communicate with her. Although averse to leaving the application in more than twenty-four hours, he should be pleased to hear an expression of opinion from those present who had tried it for a longer period.

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* Mitchell's Therapeutics.

The great danger resulting from arsenical applications remaining in a tooth for a considerable period was, no doubt, owing to the solubility of the agent; for though only slightly soluble in water, it was sufficiently so to cause difficulty, if not obviated by being hermetically sealed in the cavity.

In applying the paste to an exposed pulp, great care was usually exercised by dentists to confine the application in the cavity by means of wax, raw cotton, cotton saturated with gum sandarach, etc. etc. The objection to wax was that in pressing it into the cavity a column of air was apt to be driven before it, and by pressing upon the pulp give rise to intense toothache. Simple cotton was objectionable on account of absorbing the fluids of the mouth, and thus permitting the taste of creosote to be perceptible and annoying to the patient. The unpleasant taste of gum sandarach was also objectionable to many on account of the above reasons. He would suggest the use of raw cotton, saturated with collodion, as an excellent substitute in place of the articles named, using it as follows: A very small piece of cotton, with the paste on the side to be applied to the exposed pulp, should be placed in the cavity; another small piece of cotton laid over this, and then the cotton saturated with collodion, from the latter of which, however, a large portion of the ether has been allowed to evaporate, placed in position and packed gently into the cavity. Though somewhat gummy when first introduced, it eventually becomes quite hard and affords an admirable protection to the paste, and can also be used as a temporary filling in other cases. He had never met with any suggestion respecting this application, and offered it for what it was worth.

This subject will be continued at the next meeting.

DENTAL COMMENCEMENT.

BY G. T. B.

The annual commencement of the Pennsylvania College of Dental Surgery was held on the evening of February 28th, 1862, at Musical Fund Hall, in the presence of a large and attentive audience.

At the appointed hour the following named took their positions upon the platform: The President, and Members of the Board of Trustees; Faculty of the Dental College; and a large number of friends of the institution, many of them being distinguished medical and dental practitioners.

After some excellent music from the Germania Orchestra, and an impressive prayer, the degree of "Doctor of Dental Surgery" was conferred upon the following-named gentlemen by the President of the Board of Trustees:—

Horace A. Coe,	N. Y.	The Salivary Secretions.
M. Frank Carll,	R. I.	Orthodontia.
Daniel W. Gehr,	Md.	Alveolar Abscess.
Alfred T. Goodell,	N. Y.	The Importance of the Human Teeth.
Chas. A. Hastings,	S. America.	Impressions, Dies, and Counter-Dies.
Elwood E. Hopkins,	Pa.	Causes of Imperfect Development of Teeth.
Augustus S. Kidder,	N. H.	Development and Structure of the Teeth.
Henry Leibert,	Pa.	Physiology of the Human Teeth and Digestive Organs.
Theodore G. Lewis,	N. Y.	Tin and its Applications.
Samuel Marlor,	England.	Reasons why a Dentist should understand Anatomy.
Samuel K. Palmer,	N. Y.	Neuralgia Faciel, and Remedial Treatment.
Joseph L. Perkins,	Vt.	Salivary calculus.
Frank N. Sheppard,	Md.	Anatomy and Physiology of the Tongue.
Sparkman R. Screven,	S. Carolina.	Carbon.
C. Longstreth Smith,	Conn.	Fluids of the Mouth.
Joseph F. Végas,	La.	The Causes of Imperfect Development and Early Decay of Teeth.
Ernst L. Witte,	Germany.	The Dental Pulp.
Joseph R. Wetherill,	N. J.	Diseases of the Antrum.
N. B. Welton, M.D.,	Conn.	Articulation of Artificial Dentures.

The valedictory was then delivered by Professor J. L. Suesserott, and it has seldom been our pleasure to listen to so interesting and instructive an address; and in presenting the following synopsis, we feel more than ordinary regret that it cannot be presented entire, as it speaks in a language not only calculated to arrest the earnest attention of the graduating class, but also, we may add, the entire dental profession and the searchers after truth in science everywhere. He said:—

"The question, which every young man should propose to himself, when about to enter upon life, is—what can I do? In this world of activity and energy, this world of many wants and many woes, the thought of yielding in any degree to sluggishness, or a desire for repose, dare not be entertained by him; but if he has not a settled determination to do all that he can, coupled with willingness to act it out, he will ever appear a drone in society. Its stirring activity should ever put him upon the alert, lest he may not be able to keep step with its progress; while his own wants, and the wants of the world around him, if he will be an attentive listener, will ever urge him to earnest, untiring exertion, and furnish him with constant incentives to the fulfillment of the noblest of all purposes, devotion to the cause of humanity and the elevation of man. In this lies the secret of all true greatness, and he who rightly considers his relations to the present and the future, his obligations to himself and to those with whom he is associated, will never need to be reminded that his great work in this world, to which all others should be subsidiary, is to be useful in any and every way to man.

"To the attainment of this high position, which we trust is the object of the ambition of all of you, it is necessary that you should keep steadily in view your relations to man, and be made acquainted with the duties which those relations involve, as well as the difficulties which you may expect to meet in the discharge of them. Permit me, then, as it has been made my pleasing duty, to say a few parting words to you in behalf of my colleagues, and the cause which they represent, to improve this hour, so suggestive of buoyant hope, as well as of disappointed expectations, in endeavoring to direct your attention to some considerations which, though they may appear trite and commonplace, we do not think are either unsuited to the present occasion or unworthy of your attention.

"The course of study through which you have passed will give you all the assistance which you need in the commencement of your profession: all the improvements which have been made in its various departments, designed to facilitate the operations of the practitioner, as well as to relieve the suffering of the patient, have been presented for your consideration. It will not be improper, therefore, for us to extend to you some words of kindly counsel on the present occasion, as we take a look out upon your future course, which, believe me, gentlemen, will be fraught with the same experiences and subject to the same vicissitudes to which all life has hitherto been, though it may now be gilded over by a fervid imagination.

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"You are about to enter upon a position which, if properly used, will insure the respect of your fellow-men, and will ever entitle you to their kind regard; and it is your duty to make a firm determination, if you have not done so already, to do all in your power which will contribute to this result. Remember that it is not only sound policy, but pure morality, which dictates that you should not place yourselves in opposition to settled convictions of right and duty. Many young men adopt this course for the purpose of making themselves appear singular, with the hope of gaining a more speedy notoriety, or with the more despicable design of displaying the little ability which they may chance to possess. Truly they have their reward, but not in the manner in which they expected.

"We trust that an earnest desire to do good and relieve distress has been excited in your breasts: take care that your influence shall ever be in the right direction, and be, as far as you are able, co-operators with the good, not to be drawn from the path of duty because you do not realize what you expected to find in the world. One of the most common and yet most fatal mistakes of young men, who are about to enter a profession or occupation for life, is, that they paint all of its varied and checkered scenes, of which they have received but a very imperfect idea, in the most glowing colors that earnest youthful hope can suggest. They oftentimes, it is true, theorize about its difficulties, but imagination gilds even these, or uses them to make the lights of the pleasing picture more striking. The thick clouds, which so often overhang the pathway of man when he feels that he most needs the clear sunshine, of which they have heard from those who have preceded them in life's conflicts, are clothed with so poetic a garb by them that they apparently become eager to have similar experiences. The difficulties of life are seen only in the light of the victory which they expect to win over them, and unconsciously they are made to give place to the more glowing scenes which hope, excited by fancy, is ever ready to beget. But, believe me, life's trials are not what imagination represents them to be. The romance of early years is soon changed for something of a sterner, severer sort, wherever you may be called to act; and the roseate hues of youth's morning are quickly overshadowed by clouds. Happy will you be if you enter upon life forewarned of the real conflict, and armed with such principles as will enable you to withstand the opposition of much that is false, unholy, and untrue. You must expect to find life oftentimes a struggle, a putting the hand to the plow, from which you dare not look back: be assured that it is no holiday time, but that if you would succeed, it is to be done by constant effort, and that, too, frequently in the midst of the greatest disadvantages. Do not be deceived with the idea that prosperity will be your constant attendant, that, like the gallant bark before the balmy breeze, you are destined to ride gently and easily into the harbor of success; but remember that your path lies through rough seas, and that many a storm will lower, threatening destruction to you. You must expect from many in this world scorn and contempt, rebuff and insult, infidelity and disappointment, until your own meritorious conduct shall subdue these proud spirits, and compel them to do you homage. The common lot of man awaits you, which you have no right to expect to find free from troubles—if you deem this your high privilege, you are claiming for yourself what others, who have preceded you, have failed to find, and are seeking a royal road to true manhood, which others have attained only by persevering effort under difficulties. * * * * * * * * *

"If you would be successful, therefore, you must make your profession the one great idea of your life. Let it be the concentrating point for whatever acquirements you may make. The field of study and thought which it presents to you is almost boundless, and it should be your pride to contribute whatever you can, by faithful study and effort, for its improvement and advancement. Workmen, who have preceded you in the same field, have devoted themselves to its cultivation, and you are now reaping the fruits of their labors. To such labors, you and I are indebted for the high position which the dental profession now holds; instead, therefore, of sitting down to exclusive enjoyment of their labors, each effort put forth by them, each labor lightened, each means devised for the relief of suffering, should be an urgent appeal to you to make efforts in the same direction.

"Let it be your steady aim to make progress in your profession, and subsidize all proper means to the accomplishment of this purpose. The work which has been performed by no means proves that nothing more remains to be done; but, on the contrary, a large and far more extensive field of enterprise is thus opened up, tempting you, if you are men of proper spirit, to enter and reap its honors and advantages. Be not deterred by petty difficulties; the stern resolve will make mountains diminish to plains, and you will find that nothing is difficult to him who wills. Many men are prevented from engaging in such undertakings, because they think that they have not the appliances and resources which others have had. But let me tell you that some of the greatest achievements in science and art have been accomplished by very imperfect instruments. It is not the tools, but the perseverance and trained skill of the man that makes the workman. An eminent man of science once called upon the celebrated Dr. Wollaston, and requested to be shown over his laboratories, in which science had been enriched by so many important discoveries; when the doctor took him into his study, and pointing to an old tea-tray on his table, containing a few watch-glasses, test-papers, a small balance, and a blow-pipe, said: 'This is all the laboratory I have!' Franklin first drew the lightning from the clouds by means of a kite made of two sticks and a silk handkerchief. Watt made his first model of the condensing steam-engine out of an old syringe. Rittenhouse, the astronomer, first calculated eclipses on his plow-handle. And the celebrated Benjamin West, it is said, made his first brushes out of the hair of a cat's tail. Numberless instances might be presented of advancement, under the greatest difficulties, by members of our own profession; but it is not necessary. Remember that the mind which is disposed to work will devise means for the accomplishment of its purposes; and if you have any desire to contribute to the improvement of your profession, your tools will present themselves to you. When some one asked the painter Opie by what wonderful process he mixed his colors, his reply was, 'I mix them with my brains, sir!' Gentlemen, you will always find the same tools at your disposal, if you will only use them.

"But while we urge you to labor in behalf of your profession, and to devotion to it, we would also warn you against bigotry, or that exclusive subjection to one thing, which will prevent your seeing anything good or advantageous in other departments of labor. The avocations and duties of life make up a chain of relationships with all of which you should be in sympathy. Truth, like the rays of light, radiates forth in all directions, and it is your duty not only to acknowledge it whenever it is found, but also, as far as is consistent with proper attention to your own profession, to acquaint yourselves with it. Be not men of one idea, but make excursions constantly into other fields, at once for your improvement and recreation. In this world, which is filled with subjects for our contemplation and study, he is doing only part of his work who does not go somewhat beyond the limits, however broad, of his own peculiar calling. Thus alone can you secure that liberality of mind which is necessary not only for the proper discharge of the duties of your profession, but also to prepare you for fit relations with those with whom you will be called to co-operate. Do not understand us by this, however, to recommend to you that superficial course of study which is pursued by so many, who merely glance at subjects without giving attentive study to anything, who, like shallow cisterns, are very easily exhausted. Let your determination to know as much as you can be coupled with another of greater importance, to dismiss no subject until you have mastered it, and thus every step which you take will help you to an easier advance in your future efforts.

"Be honest enough never to pretend to be what you really are not, and lay claim to nothing which you do not know. Be honest! Rather let your deficiencies lead you to greater exertions. There is nothing so despicable as the use of a professional garb as a screen by which to overreach others, and nothing which is so sure to defeat itself. This more than anything else has served to bring discredit upon professional men, and has rendered quackery respectable, because practiced by those who are clothed with the dignity of a profession. Let all your efforts be directed to the furtherance of truth, and thus you will be preserved from all improper efforts at advancement, and will insure to yourselves that self-respect which is indispensable and of more value than all the gold which you may obtain by refined trickery and deception. * * *

"Let your intercourse with those who are engaged in the same profession always be courteous, (I do not, however, include quacks and parasites.) You are now about to enter the arena of professional conflict; many circumstances will arise to try your characters, and many temptations will be presented to induce you to follow a selfish course; but remember that the only proper part for you to perform is that which will promote a general interchange of friendly offices. This is the only way in which you can retain the respect of the community, and thus you will not compromise that dignity of character which should be the lofty ambition of every man, and especially of the professional man. There is another point which suggests itself here, to which we wish to direct your attention. It has been a matter of too common occurrence for men of the different professions to be found not only opposing each other, but also going far out of their proper sphere to find materials to aid them in their opposition. Such a course is the result of a defect in early training, of passion, pride, and prejudice, and too often, we have reason to believe, of total ignorance of the principles which they are striving to maintain. * *

"Learn to think and act for yourselves. Be not the slaves of individual or public opinion, but fearlessly and unhesitatingly use the results of your own study and labors, (when properly conducted.)

"Be determined to succeed. If your profession is worth anything it ought to be all things to you, and you should not, therefore, enter upon it without a firm determination to succeed. Too many young men now-a-days enter upon life with a tacit understanding with themselves, that if the business in which they are to engage does not pay, to use their own language, there are many other expedients to which they can betake themselves; and, like the young man who trusts to his father's wealth or the social position of his family to do all things for him, they accomplish nothing, but fritter away their energies by dividing them among a score of different enterprises. It is to be presumed that, as reasonable men, you weighed the matter well and counted the cost before you determined to select the dental profession as your field of labor. Abide by that decision, though many tempting prizes may lure you to forsake it for more tempting and different pursuits. Experience has taught, again and again, that he who is faithful to his *prescribed* calling is a greater gainer, ultimately, than he who is so readily won off by everything which, for the time, bids fair to be profitable. Fixedness and determination are some of the lessons which you will now have to put in practice, and your faith in your preconceived ideas of their value will be put, at times, perhaps to a pretty severe test; but endeavor to brave the test, and the ultimate reward will be more than a compensation for your endurance. Be decided in all that you do, and let it be known, as it will be without any effort on your part, as a prominent feature of your character. * * *

"Now more than ever the world is throwing off the cerements of the past. The work of centuries is crowded into days. The day of a higher, nobler, and, we humbly trust, holier development is fast drawing nigh, and we all should endeavor to prepare ourselves for it. While these surgings and heavings are going on in society, no one should be an inattentive spectator, but each one should gaze eagerly for some new token of the approaching dawn; for the first rays of that purer light as they break through the surrounding gloom. By it, faint glimmering though it be, prepare yourselves for whatever may await you. This hour of our country's trial hath vicarious power for ages to come, and is the harbinger of good for the world, and of a nobler freedom for man. You have your part to perform in this matter; see to it that it is well done. Make the world better by your having lived in it. It is the demand which will meet you on every hand, and you can contribute largely to it by a simple, unobtrusive life.

"'Life does not pay!' is the echo that reaches us from the most remote ages of the past. 'Life does not pay!' is the melancholy conclusion of the disappointed devotee to pleasure or self. But life does pay, when viewed as a means for the accomplishment of good for man, and used as a contest of the right against the wrong. The happy assurance that we have done good, that we have caused joy to some saddened heart, that we have been the victors over self and error, is more than a compensation for trial and suffering. When the present dark page of our country's history is written; and when high on the galaxy of fame is recorded the name of an Ellsworth, a Winthrop, a Lyon, and a Baker, unenslaved and admiring millions will read, and will hear reverberating in thunder-tones, 'life is not an empty dream.'

"A column of living vapor is now ascending heavenward from off our country's altar. May it be your guiding cloud by day, and pillar of fire by night! The immortal spirits of patriot martyrs are now urging you to the full performance of your duty in whatever department of life you may act. Though you may not be called upon to lay down your lives in the present conflict of right against a mighty wrong, they urge you to devote all your energies to the furtherance of truth and justice, and the speedy inauguration of the day when the hydra-headed monster, that has already too long exalted himself, shall be destroyed.

"'Thus error's monstrous shapes from earth are driven;
They fade, they fly, but truth survives their flight;
Earth has no shades to quench that beam of heaven;
Each ray that shone, in early time, to light
The faltering footstep in the path of right,
Each gleam of clearer brightness shed to aid
In man's maturer day his bolder sight,
All blended, like the rainbow's radiant braid,
Pour yet, and still shall pour, the blaze that cannot fade.'

"It remains but to utter the parting word, and I do it with all the sincerity which can attend an earnest desire for your good. May you fare well in every situation in which your professional character may call you to labor! May you fare well in all the relations of life, and, when its errand is performed, may it be more beautiful than ever in its evening-time, like the autumn, rich with golden sheaves and aglow with promise of a blissful eternity!"

The address was delivered in a full, clear voice, so as to be distinctly heard in the most remote parts of the hall, and elicited from the audience the warmest applause.

The clinical reports which we append give evidence of continued usefulness and prosperity in the important branches of manipulative practice—

OPERATIVE DEPARTMENT.

620 *patients, for whom the following operations were performed:—*

Gold Fillings	454
Tin Fillings	325
Temporary Fillings	11
Amalgam Fillings	7
Treatment and Filling of Pulp Cavities	113
Superficial Caries Removed	15
Extraction of Teeth and Roots	2464

Removal of Salivary Calculi	75
Pivot Teeth Inserted	13
Treatment of Inflammation of the Gums	20
" Alveolar Abscess	44
" for Irregularities	51
" Necrosis	3
Removal of Tumors	2
Total	3597

MECHANICAL DEPARTMENT.

Whole sets of Teeth	18
Upper Sets	31
Whole Set Block Teeth	1
Whole Upper Sets, Block	3
Partial Sets of Single Teeth	20
Whole Number of Teeth Mounted	1210

We are gratified to know that although the number in attendance on the course the present session is not as large as the previous one, still the matriculating list presents the names of forty-four students.

GLEANINGS FROM PROCEEDINGS OF THE NEW YORK CITY DENTAL ASSOCIATION.

BY J. S. LATIMER, D.D.S.

In these gleanings it is not proposed to do more than gather and perpetuate such ideas dropped in discussion of the papers read as would otherwise fail to reach any beyond the members present. That *all* the valuable ideas advanced in such discussions are to be reported, is not expected, for various reasons, among which may be enumerated the facts that have long been before the profession, and that without the aid of stenography, or its equivalent, much may be lost from inability to report as perfectly as is desirable. The papers read at the opening of each discussion are usually published entire, and with them this report will not meddle. I find the following memoranda made in the meetings at various times, extending down to February 23d, 1862:—

Dr. Atkinson (January twenty-second) expressed the opinion that lateral pressure, except of recent origin, could never cause facial neuralgia. The pressure employed in separating teeth would sometimes prove an exciting cause, and that mainly from the attenuation of the nerve at the apex of the fang. He thought tartar might be an auxiliary by the irritation of the gums. Had seen cases which he believed were produced by nodules in pulp cavities.

Dr. John Allen gave the history of a case in which he had reason to believe that neuralgia induced by exostosis was by pressure upon and attenuation of the nerve.

He had seen *tic douloureux* accompany diseased antrum, in which the dental branch of the superior maxillary was involved with the necrosed walls. He cited a case in which neuralgic paroxysms were brought on by taking a glass of wine; at which times the patient had such tenderness at the bridge of the nose as compelled her to remove her steel spectacles. In reply to a question, the doctor said that the lady was wearing a metallic plate.

Dr. Atkinson incidentally remarked that secondary dentine is generally deposited in consequence of thermal irritation.

Dr. Atkinson, in discussing the subject of diseases of the teeth, said he treats exostosis by cutting through to the fang with a strong lancet. He believed a decided excess of alkali in the buccal secretions might break down the teeth; to which theory Dr. B. W. Franklin took exceptions, and earnestly advocated the exclusively acid theory.

Dr. William H. Allen recommended tr. iodine to the gums in case of their recession from too free use of mercurials.

Dr. Stratton presented a molar similar in form to those of the superior maxillary, which, he said, he had removed from the lower jaw of a lady afflicted with facial neuralgia. A cavity in the tooth, which penetrated to the pulp and produced the distress, was entirely covered by the gum.

Dr. B. W. Franklin, speaking of sensitive dentine, said acid is the cause, and he years ago treated it with a solution of the carbonate of soda, letting the patient hold some of the solution, moderately strong, in the mouth, frequently during the day, for the purpose of neutralizing the acids of the oral cavity; besides which he advised swallowing a teaspoonful of the alkali four or five times daily. By this plan he had succeeded in removing the sensibility in four or five days.

Dr. John Allen corroborated the theory of Dr. Franklin with a statement of his experience.

Dr. R. T. Ambler related an interesting case in which, during gestation, it became necessary to fill some exceedingly sensitive teeth. In accordance with a suggestion of Dr. Franklin, he had the patient use the solution of carbonate of soda, when, at the end of a week, the teeth were excavated without pain.

Concerning the treatment of teeth with exposed pulps, Dr. Atkinson remarked that he employed from $\frac{1}{10}$th to $\frac{1}{6}$th gr. arsenious acid for the destruction of the pulp, according to the density of the dentine and the diathesis of the patient. When the patient is more than twenty-five years of age, the arsenic may remain twenty-four hours. He thinks a pellicle of arsenite of albumen is formed about the destructive agent, which, unless broken, prevents its further effect. When he finds this condition, he punctures the pulp, and generally has no trouble after the second application. He has been successful in saving teeth when only half the periosteum remained, and that not *perfectly* healthy. If dentists cannot cure such teeth, they should not extract them, but send the patient to a more enlightened operator. When periostitis follows the filling of fangs, he reduces the circulation by producing emesis and thus general relaxation; besides which, he cuts through to the point of the fang, and there medicates.

Dr. J. Allen uses arsenious acid and creosote without morphia, and covers the pellet with dry cotton. Succeeds in nineteen cases out of twenty. He could not say he had succeeded so well with the lancet as he could wish, because of his inability to define the exact locality of the inflamed peridental membrane.

Dr. Burras said he inserted two central incisors on pivot twenty years ago, and they are good yet.

Dr. B. W. Franklin said he inserted the four superior incisors for a gentleman who had no other teeth on that jaw with which to masticate, and yet they served him twelve years.

Concerning anæsthesia and anæsthetics, Dr. Franklin said he had seen a gentleman lately who proposes to use the condensed vapor of chloroform for local anæsthesia, and was about perfecting an instrument for its application. He believed there is a difference between life force and vital force, and that we shall one day be able, by measurements of the cranium and other external signs, to distinguish those who can safely inhale ether and chloroform.

Dr. Atkinson had been successful with congelation, and had not seen sloughing supervene except where the frost had been too hastily removed by the application of warm water.

It would be better to hold *cold* water in the mouth. Unless the precaution is taken to hold cool and then ice water in the mouth to prepare the tissues for the freezing mixture, much pain is sometimes produced.

Dr. John Allen approved of neither congelation nor electricity for the production of anæsthesia. He argued that pain is more in the patient's fears than in reality, and said he sometimes applies to the gums of timid patients a mixture of chloroform, tr. aconite, and tr. arnica, which had the effect of lessening fear. He condemned the practice adopted by some, for the purpose of getting practice, of advertising to extract teeth without pain. Believed cerebral congestion always precedes death from the use of chloroform.

In defense of electro-magnetism, Dr. Atkinson said whatever withdraws attention from the lesion prevents the recognition of pain; in proof of which he instanced the fact that men received injuries in battles of which they were not aware until the excitement of battle had passed. In the removal of teeth without pulps, and which have no periosteal inflammation, little pain is felt.

EDITORIAL.

OXY-CHLORIDE OF ZINC.

We spoke of the above-named substance in the August number of the Dental Cosmos. Our experience with it was at that time very limited; still we had great confidence in it. We did not intend to speak of it again; but, as several dentists have inquired of us about it, we know of no better way to express our views than to give our experience with it. Except in very few instances, we have confined the use of it to *dead teeth* only; not so much on account of the fact that it excites pain when applied to living dentine, but, as a general rule, we find strength enough in a living tooth to bear the pressure of consolidating a gold plug; and when that is done, nothing yet known is as good. Many dentists believe that a large plug will arrest decay in a tooth as well as a small one, if equally well put in. This is not quite true. When the borders of a cavity become thin, especially in a dead tooth, from some cause or other, they yield from a gold, and much more from an amalgam plug; decay sets in, and finally causes the tooth to break away until the plug is lost or rendered useless. All metal plugs have a tendency to come out of their cavities, and we often have watched them for years, until they finally fell out. They seemed to rise from the cavity like a stone in spring when the frost is coming out of the ground. In such cases, a sediment is found below the plug. We once said that dampness permeating the dentine helped to dislodge a plug. Perhaps the unequal expansion and contraction between the material of a plug is also a cause why a plug becomes useless or finally falls out of a tooth. We have elsewhere said that the best substance to make a plug would be such material that would shrink and expand with the tooth, and be nearly as permeable. This may be an abstraction, but nevertheless we will draw the inference. The larger the plug made of metal, the stronger the mechanical hold should be to retain it in the cavity; indeed, every plug should be held in by the walls of the cavity grasping it, like an apple is held in the hand, or its durability is doubtful. We make this last remark partly to refute the absurd practice which has obtained, to some extent, in these days of "sticky" gold, that, if an anchorage is obtained in one part of a cavity, the balance of the plug will be retained by the adhesive quality of the gold. We have seen some deplorable failures lately of this *pan-handle* principle, of expecting plugs to be held in teeth. However, we will go back to "oxy-chloride of zinc" and "os artificiel;" both articles are good. We prefer the former, but most emphatically say that their use has been abused. To get the full value of these articles, they should only be used in certain cases; those certain cases are large cavities in the sides of the teeth, back, front, or buccal surfaces. In front teeth that are dead and very thin, as teeth plugged with these substances do not discolor as when plugged with gold, we find that this material remains in closer contact with the walls of large cavities than gold; but when it is brought into use by chewing or brushing, it rapidly wears away. Still in such cases it can be renewed with facility. To use these substances indiscriminately in medium-sized cavities is bad practice. As a temporary plug, as well as Hill's stopping, until a tooth becomes better developed or conditioned to be properly filled with gold, they are invaluable; such as in the first molars of the second set of teeth in children when they are badly decayed, and there is no knowing whether the teeth will ever be of much value to the patient. We have just filled two large cavities in the two inferior molar teeth of a boy of ten years of age, which had been plugged over a year since by an intelligent dentist in a neighboring city. The teeth at that time were not yet firm in the gum, and the patient too restive to let the dentist make good gold work. By a judicious use of these substances, with intelligent patients, great good can be done, much labor saved to the dentist, and expense to the patient. As an auxiliary in our practice, we consider it a godsend, and an advance step in the improvement in the dental art.

A few months since, we sent a few ounces of the os artificiel to a distinguished friend in Paris, France, and recently received an order for a few ounces more. And to show the esteem in which it was held, we make the following short extract from the letter accompanying the order: "Please send me immediately, by express, two or three ounces of the white paste or stopping, as I am in great want of it. Please let not a moment be lost. *Send by express.*" J. D. W.

DENTAL ASSOCIATIONS.

Those who recognize in associated effort a powerful means in the advancement of the profession, must feel gratified and encouraged in observing that, notwithstanding the continuance of our national difficulties, a number of dental societies in different sections of the country have held very interesting meetings during the past few months. It is particularly gratifying to notice that the profession in New York have entered upon the good work with commendable spirit; and it is to be hoped that other cities in which there is, beyond all doubt, the right kind of material, will move in the same direction, for nothing can be more self-evident than the fact that to develop all the power and to discover all the resources of a profession, the animating influence of association is imperatively demanded. One of the great advantages in such association is that knowledge, in place of being confined to the few, is diffused among the many. Again, a number of intelligent persons, each with different experiences, and well informed in his specialty, by communing together afford and derive mutual benefit.

While admitting that individual effort, single and alone, may accomplish much in the advancement of a profession, and that there are some minds so constituted that they may wear out, but cannot rust out, and to whom the cultivation of science is a necessary part of their existence, even these cannot be injured by association with their fellows, but, on the contrary, would be stimulated, and in turn stimulate others to much greater efforts than could be accomplished without it.

As an illustration of the disadvantages resulting from an absence of such intercourse, who can question for a moment that there are many able practitioners, located in obscure country places, possessing talent, sagacity, and practical information, which, under more favorable auspices, would shed lustre on their names and calling, but who, unfortunately, are environed by influences which prevent the full development of their powers? And it is not surprising that one thus situated, rarely meeting those who sympathize with his professional anxieties, or appreciate his desire for a more extended acquaintance with the science of his profession, soon learns, from the significant expressions, or still more eloquent silence of his auditors, that the introduction of such topics render him liable to be regarded as a bore, and is insensibly led to take more interest in the ordinary gossip of the day, politics, etc. than in the prosecution of his legitimate studies. There are, however, advantages as well as disadvantages connected with such a situation; for, although there may be an absence of the stimulus to exertion only found in large cities, viz., the perpetual collision of intellect and the pleasurable scientific intercourse exciting and sustaining an unceasing interest in everything connected with the science and art of the profession, one who is animated by a deep and earnest desire for self-improvement will find that a regular and systematic course of study can be prosecuted with less liability of interruption, and with fewer inducements to lead him off in a rural district than when surrounded by the thousand and one excitements of city life.

In each place one must possess more than ordinary energy, application, and professional enthusiasm to be enabled to resist the tendency to indolence, on the one hand, or indulgence in more sensual gratification, on the other. The remedy to counteract the inclination to either is to be found in association. In cities, where opportunities are constantly afforded for such reunions, it is the resident practitioners' fault if they do not take advantage of them; but it is not so with the country practitioner—isolated, cut off from association with his fellows by distance, and possibly, in some instances, with means so limited as to debar him from indulging in the expense attendant upon traveling to an annual gathering of his fellows, yet feeling, at the same time, an earnest desire for communion with them, his case is one well worthy of commiseration and sympathy, and an effort should be made on the part of those more favorably situated to extend to him the hand of fellowship and encouragement on proving himself worthy of it.

This may be accomplished by old-established associations electing persons at a distance, who may give evidence of ability, as corresponding members. Recognition of this kind, if kept within proper bounds, would be an acceptable evidence to them that their labors in behalf of the profession were duly appreciated by others, and would also have a tendency to encourage them to make still greater efforts; for such acknowledgments should not be made as mere idle compliments, but with the expectation of developing the latent powers of the profession.

As corresponding members of associations, although unable to attend the meetings, they could contribute largely to their usefulness by transmitting, from time to time, carefully-written essays to be read before their colleagues. The reports of the proceedings of associations, when of an interesting and instructive character, and properly presented in the columns of magazines, cannot but exert a healthy influence on such minds, as it is somewhat of an equivalent for the fellowship so congenial to their tastes, from which they are debarred. Reports consisting mainly of the dry details of the order of business, election of officers, reports of business committees, etc., which nobody feels interested in or ever thinks of reading, and on which the time of the writer, and the printer, and the space in the magazine, might have been more profitably devoted in some other direction, or statements that Drs. So-and-so gave their theory or mode of practice, and yet leaving the readers entirely in the dark as to what the theory or mode of practice might be—afford neither satisfaction nor information to any one. The leading points of business, of course, should be presented, but in as brief a manner as possible. In this way ample space is secured for a clear and comprehensive report of discussions, which should give, as near as possible, not merely the ideas, but the language of the speakers. J. H. M'Q.

DENTISTS IN MILITARY HOSPITALS.

A FEW months back, in anticipation of a forward movement on the part of the Federal Army, a number of military hospitals were established in Philadelphia, New York, Cincinnati, St. Louis, and other cities, and placed under the care of surgeons and assistant surgeons selected from resident medical practitioners in each place. Of late these institutions have been crowded to their utmost capacity by sick and wounded soldiers; and while nothing is left undone that can contribute to the comfort and welfare of the patients, on the part of the medical officers, no provision has been made as yet to supply the institutions with persons properly qualified to attend to cases, that must be presented frequently, in which patients suffer intensely from a deranged condition of the teeth.

On a former occasion we directed attention to the difficulties attendant upon the introduction of dentists in the army and navy; the objections urged then, however, do not hold good so far as hospitals are concerned. The dentist, appointed in connection with such an institution, would only be under the necessity of visiting it certain days in the week, and thus would be able to attend to hospital and private practice in the same manner that the surgeons connected with them do. It would be impossible, of course, for those who are constantly engaged in private practice to accept such positions; but there are a number of gentlemen who have been in practice for from one to three years, who are eminently qualified for such positions, have the time, and would be pleased no doubt to render any service in their power in such a direction. J. H. M'Q.

HARD RUBBER HANDLES FOR DENTAL INSTRUMENTS.

No substance within the past few years has been employed for a greater variety of purposes than hard rubber. In the arts, in domestic economy, as a base for artificial teeth, etc., it appears in each and all to have answered every indication. The latest application of the substance is in its use as handles for dental instruments, a direction in which it will no doubt prove as useful and valuable as in those just referred to. We are not aware that the slightest allusion has ever been made to its employment in this direction, in the dental journals. The first intimation we had of the application was something over a year ago, when, in the course of conversation, Dr. Buckingham referred to it as a substance decidedly preferable to the leather handles which Dr. Allport had exhibited when in Philadelphia. Subsequent to this conversation, Dr. Buckingham had a number of instruments made to fit in shanks of hard rubber, and after using them for some time speaks very favorably of them as having fully answered his expectations.

Quite recently we were placed under obligations to Dr. Richardson, of Cincinnati, for a very neat and valuable plugger, with a handle made from this substance, and our experience with it is decidedly in confirmation of the advantage that will accrue to the profession from the extended employment of hard rubber for such purposes.

The applicability of the rubber in this direction appears to have suggested itself to Drs. Buckingham and Richardson simultaneously, and each one has been working on without the knowledge that the other was engaged in the same direction.

Since writing the above we have been informed that Dr. Wheat, of Connecticut, had handles made of hard rubber for dental instruments several years ago, but that no effort has been made on the part of manufacturers to supply the profession with them. J. H. M'Q.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

BRITISH JOURNAL OF DENTAL SCIENCE.

"ON CERTAIN CONDITIONS PRESENTED BY AMALGAMS USED IN FILLING FAULTY TEETH.—*(Continued from page* 392.)—In slide No. 9 the same materials were employed, but the combination was effected by rubbing the filings and mercury together in the palm of the hand. The washing was also omitted. The result due to the difference of manipulation is a plug presenting a much rougher and more granular surface than No. 8. It is separated from the walls of the cavity; and the mass has failed to enter the fissures prepared to test its powers of penetration.

"Slide No. 10 contains an amalgam furnished to me by Mr. Jameson, and consists of the following ingredients: tin 10½ dwts., silver 1 oz., gold 1 dwt. The filings were incorporated with the mercury in a mortar, and subsequently washed with ammonia, the excess of mercury squeezed out, and the mass introduced into the cavity in the manner described. The bottom of the plug showed a broken and granular surface, and an incapability of penetrating into minute fissures.

"Specimen slide No. 11 contains a plug introduced by our treasurer, Mr. Rogers. It consists of pure palladium and mercury, the two metals having been combined by friction in a mortar. In this plug there are obvious indications of contraction. I am indebted to Mr. Rogers for a second specimen, No. 12, in which the results are more satisfactory; but in this the metal has not penetrated into all the fissures. The surface presented by each of the palladium plugs is very finely granular, but not in this respect superior to the copper amalgam.

"In producing the specimen plugs, the operation has in each case been conducted with care, and the results are quite as favorable as would have been obtained in the course of practice. Having discovered the difficulty of forcing an amalgam into minute fissures, I might by specially-directed efforts have obtained more successful results; but my object has been to test the qualities of the several compounds, when employed in the treatment of carious teeth, with the usual amount of care. I may mention that if an excess of mercury be retained with a view of rendering the operation more perfect, the failure will not be less pronounced. The mercury will be squeezed out into the fissures, leaving the solid metal behind. Again, if the mass be deprived of mercury, so as to render it crumbly, the surface of the resulting plug, where resting against the walls of the cavity, will be broken and irregular.

"My investigations up to the present time lead to the conclusion which an examination of the specimens before the society will, I think, fully justify—that our present knowledge respecting the compounding of amalgams suitable for dental purposes is in a very unsatisfactory state. Take, as an example, the two specimens of palladium plugs, in each of which the composition is supposed to be similar, while, owing perhaps to slight differences in the manipulation or to the quantity of mercury used, a want of uniformity in the results has been produced. Again, a plug produced by rubbing mercury with the filings prepared by Messrs. Ash in the palm of the hand varies considerably from another in which the mercury and filings were thoroughly incorporated in a mortar, and the mass washed with ammonia. When the uncertainty in the character of an amalgam plug is admitted, and the difficulty of forcing the metallic paste into fissures or minute angles is acknowledged, we need not, I think, be at a loss to account for the difference of opinion which prevails respecting the durability of amalgam plugs generally, and respecting the comparative excellence of the several kinds of amalgams.

"There are those who prefer before all others the pure copper amalgam; and if regarded for its physical properties only, it unquestionably stands in the foremost rank; but the black color it assumes and imparts to the tooth, and the strong metallic taste its presence in certain cases establishes, justify its condemnation; still, notwithstanding these objectionable qualities, I doubt whether we should be able to find amalgam plugs which have preserved teeth for a greater number of years than such as have been composed of copper and mercury. A palladium plug, if produced under the most favorable circumstances, is in its physical characters equal to one of copper, and the great superiority in its chemical character places this amalgam at the head of the list. At the present time, the metal is so rare that its general use even in the quantity which might be required for dental purpose is prohibited. So far as my own limited experience has gone, the qualities of the samples furnished have varied. In some cases, the mass has hardened with such rapidity that an insufficient time has been allowed for its introduction into the tooth; in other specimens the hardening process has extended over some hours—a variation suggestive of differences of composition.

"I rarely use amalgams in teeth which admit of the introduction of a gold or tin-foil plug—in other words, in teeth which afford a reasonable chance of preservation, and in the treatment of which the qualities of the material used would be fairly tested. Although my experience in the use of amalgams is limited to the results obtained in the treatment of unpromising cases, I am fully prepared to support the opinion that these compounds are of great practical value. The issue of the experiments I have laid before the society points to sources of failure, and at the same time affords satisfactory evidence in favor of the impression that a more accurate knowledge of the properties of these metallic compounds, and a more careful manner of use, would greatly increase the value of amalgams in the practice of dental surgery. I hope to bring before the society a continuation of these observations, and trust the members will consider the subject sufficiently important to engage their attention in the investigation, and that they will be induced to institute experiments both as respects the properties of amalgams and the best methods of using them. Our efforts should, in the first instance, be directed toward the production of a metallic paste which will receive and retain after hardening a perfect counterpart of whatever surface it is pressed upon. It should have no surface, granular or otherwise, peculiar to itself. It must be free equally from contraction and expansion during its gradual induration; and, in addition to these properties, it must resist such chemical agents as may be applied to it in the mouth.

"It is possible that the materials at present in use may, under certain conditions of treatment, combine all these properties. If so, these conditions are not generally known. It remains for me to tender my thanks to those gentlemen who have kindly furnished me with specimens for experimenting upon, and to state that those preparations upon which I have made no report will receive my attention on a future occasion."

"Mr. T. A. Rogers.—With regard to Mr. Tomes's paper, I think he has taken us rather out of our depth, and we are scarcely able to follow him. We were probably little prepared to find such imperfections in stoppings which we were accustomed to imagine filled every chink, cranny, and crevice of the cavity. He is, however, rather exacting in his requirements. I heard him, a few days since, very cross because an amalgam filling which he had put in ten years ago was *beginning* to wear out. (Laughter.) I imagine that when we are obliged to use amalgams at all, we do not expect them to last much longer than that. Then, again, even if we were to place a tooth in the vice in the workshop, and plug a cavity in it with gold, using the utmost possible pressure, and then examine such a plug under the microscope, we should find a state of things not exactly in accordance with our ideas of solidity. Practically speaking, amalgams answer our purpose in such cases as a good dentist would think it advisable to use them. Gold is far preferable, and the rule should be to use gold in all possible cases; but where we cannot make a good, effectual gold filling, to make a good amalgam stopping rather than an indifferent gold one.

"Mr. Harrison.—I quite agree, sir, with Mr. Tomes, that this is a subject which ought to be taken up by the profession; and I hope that, after the paper he has read to us this evening, the investigation of it will be taken up and pursued by practicing dentists in a more scientific way than has hitherto been done. Speaking practically, however, I think, with Mr. Rogers, that we have no reason to complain of the preservative qualities of certain amalgams which we have already in use. I have, in my own practice, seen many cases in which amalgam stoppings have lasted twenty years and upwards, and happen to have met with one case in which such a stopping lasted fifty-seven years in the person of an old gentleman who carried the stopping to his tomb, and who gave me so peculiar a history of the practitioner who introduced it that there could be no doubt about its date. I saw this gentleman for the last time about two years before his death, (the stopping having then been in the tooth fifty-seven years,) and the tooth was at that time in a perfect state of preservation, and the stopping perfectly sound. I think, therefore, that, with frequent examples of such stoppings having lasted twenty and twenty-five years, and one of its having lasted fifty-seven years, we have no reason to complain of the preservative qualities of the amalgams we already have. What we mainly want, I think, is an amalgam which, while it will preserve the teeth as well as those we already have, will at the same time preserve its own color and the color of the teeth more perfectly than any we are yet acquainted with. This is a subject the study of which I think well worthy of our best attention. I will not venture to say, from the trials I have made of the known amalgams, which are the best; but I am inclined to think, of those I have tried in private, that an amalgam made of palladium, and one which I have occasionally used containing a very large proportion of gold indeed, are those which I have found last the longest and preserve the color of the teeth most perfectly. I am free to confess, however, that, for convenience, I am now in the habit of using the amalgams (as we most of us, I believe, do) which are prepared for us by parties not in practice as dentists, and who, taking a merely commercial view of the matter, naturally enough keep their preparations secret. I do this, however, not without reluctance, from the very fact that I do not know their composition; and I do hope, as I have already said, that the profession will take this subject up, after what Mr. Tomes has said, and investigate it scientifically, giving to each other the results of their experience as to the materials, and their proportions, which are found to be best for carrying out two great objects. These, I think, sir, are the great points which Mr. Tomes's paper endeavors to press upon us, and I trust they will not be pressed upon us in vain.

"Mr. SERCOMBE.—In the course of Mr. Tomes's paper I observed that he spoke of washing his amalgam with ammonia. I should be glad to know whether he has tried washing it with chloride of zinc or chloride of sodium—a plan recommended in one of the American associations some time since.

"Mr. TOMES.—I have not used either of the compounds which Mr. Sercombe has mentioned, but have confined myself to ammonia only. By the use of this a large quantity of dark matter has been separated from the amalgam, which has been rendered somewhat more plastic by the process. In respect to the remarks which have fallen from Mr. Rogers and Mr. Harrison, I may state that I fully concur in all they have said. The object of my paper, however, has not been to condemn the employment of amalgams, but to admit their usefulness, and at the same time to point out that their value would be rendered much greater if we had a more accurate knowledge of their qualities—if we could obtain an amalgam which would enter into the minute fissures of the teeth, and there harden without undergoing any contraction: in point of fact, an amalgam which would really fill the cavity within which it is placed."

THE VULCANITE—FEBRUARY.

"VULCANIZED RUBBER FOR ARTIFICIAL TEETH. By G. L. ELLIOTT, Dentist, Toronto.—The fortunate discovery of vulcanized rubber as a material for plates for dental substitutes I hope will be deemed a subject of sufficient importance to answer as an apology for a few brief remarks upon its peculiar and unquestionable merits. And I have thought it not altogether unpardonable if I should do so through the medium of a letter circular, which may, perhaps, be of some interest to the public, and more especially to those who have had the misfortune to lose, in part or altogether, those highly useful and ornamental organs, the teeth.

"Vulcanized rubber has been very cautiously adopted by the dental profession; indeed, it never was accepted until it had withstood such severe tests as other materials formerly used have never been subjected to. It is now generally used, both in the United States and England. In the City of London, particularly, it is used by the most respectable dentists; and I will take the liberty to mention Mr. Rahn, formerly of Toronto, as one who has adopted it in his practice. Mr. Rahn was well known here as a superior surgical and mechanical dentist, and he now stands at the head of his profession in London, England.

"But with the abundant proof of the utility of vulcanized rubber, we have only to add the universal testimony of those who have formerly worn gold plates, and have now substituted the rubber for them. That it is much more comfortable, I may say perfectly so; that it has a very great affinity with the gums, *are facts* which cannot be questioned. Rubber plates are also very light, which is another important item to be considered. And we are therefore enabled to add the more, so as to restore the face to its original form, and give it a roundness of expression.

"Unlike metallic plates, they are not injured by a fall; how many gold plates have been ruined by a fall of even a few inches! Rubber plates may be dropped a hundred times without the slightest injury.

"I have been inserting teeth upon vulcanized rubber sufficiently long, in a practical point of view, to discuss, and, I believe, with an unbiased mind, its merits and demerits; and I need not add, that I take great pleasure in recommending it as a base for artificial teeth. The impression being taken with 'gutta-percha,' and metals being dispensed with altogether in the rubber process, thereby escaping the shrinkages to which metals are subject, enable us to obtain a perfect fit of the jaw. Rubber, being also a vegetable production, and being a less foreign substance to the human system than gold or other metals, is found to harmonize perfectly with the gum, and to produce no irritation in the mouth from pressure. Vulcanized rubber is found to be especially applicable to cases for the under jaw.

"I have had such unparalleled success with parts of sets for the under jaw, that I could scarcely believe it to be real. I will make a few brief remarks upon those cases in which gold plate has formerly been used. First, then, more time, more expense, more trouble, both mentally and physically, have been given to partial *under* sets inserted upon gold plate, than all other kinds of dental substitutes, partial or entire, combined; and all comparatively to no purpose. I have had any number returned of my own make, and I have seen as many made by other dentists to as little purpose.

"The reason is, and I express the opinion of others as well, that the formation of the alveolar process of the under jaw, when sufficiently absorbed, is most unfavorable for a metallic plate of any kind. Also, that the bone of the under jaw is so thinly covered with gum, and the mucous membrane so exceedingly thin and delicate, that the slightest pressure of any metallic substance will produce irritation.

"Dr. Harris, professor of the first dental college ever established, and a man of over forty years' professional experience, in speaking of partial sets for the under jaw on gold plate, (I mean the double teeth for either side of the under jaw,) says: 'It is exceedingly difficult, and sometimes impossible, to replace the others in such a manner as to render them serviceable.'

"In such cases, then, vulcanized rubber comes to our aid, and we are able to insert them with perfect success.

"Where a person has lost even one double tooth it can be replaced and made comfortable and useful, which has formerly not been the case. Teeth of replacement for the under jaw have always been a subject of serious consideration with the dentist, *as in neither jaw does the loss of teeth so much change the expression of the countenance, and alter the whole contour of the face, as the lower jaw. To give the face, then, a roundness of expression, it is especially requisite that the under jaw should have its full complement of teeth, either natural or artificial.*

"And it is not surprising that both patient and dentist hail with the greatest pleasure the discovery of a material which relieves the former of suffering and annoyance, and the latter of a great deal of trouble. Vulcanized rubber for teeth has been in use in the United States for over six years, and therefore has been thoroughly tested. Equal in durability to gold, and possessing much greater strength and tenacity, I have seen them placed upon the floor and a man stand upon them with his whole weight without in the least altering their shape."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Dentine.—The following summary of DR. LIONEL S. BEALE'S observations upon this subject is given in an abstract of his lectures on the Structure and Growth of the Tissues of the Human Body, in the *Quarterly Journal of Microscopical Science* for January, 1862: "There are few anatomical questions, Dr. Beale observed, which have given rise to more controversy than the structure and mode of formation of the dentine; and the very last writer on the subject, M. Lent, describes the dentinal canals as consisting of direct processes of the whole dentinal cells. 'The matrix of the dentine is not formed of the dentine cells, but is a secretion of these cells and of the tooth pulp; in other words, an intercellular substance.'* Now Mr. Tomes has shown that the dentinal tubes are occupied with a soft, solid structure, which may be seen projecting in the form of solid processes from the broken ends of the dentinal tubes. The truth of these observations has, however, been doubted by several observers. Dr. Beale has been able to verify Mr. Tomes's statements as to the dentinal tubes being occupied with this soft structure, and sent round a preparation in which this material had been colored red with carmine, and was most clearly demonstrated. The dentinal 'tubes' of a *living tooth*, Dr. Beale says, are never empty; indeed they are not tubes, nor are they canals for the transmission of nutrient substances dissolved in fluid, but they contain a soft, solid substance, the central portion of which is in a state of active vitality.

"If, for a moment, one of the soft nuclear fibres of tendon was supposed to be surrounded with a matrix impregnated with calcareous matter, a good idea would be formed of the structure of the 'dentinal tube' and its contents.

"The wall of the tube with the matter between the tubes correspond to the 'wall' of an ordinary cell, or to this and the intercellular substance, (*formed material,*) and the contents of the tube to the granular cell contents with the nuclei, (*germinal matter.*) If the tissue of the pulp just beneath the surface of the dentine be examined, a number of oval masses of germinal matter colored intensely red by carmine are observed. These are nearly equidistant, and separated from each other by a certain quantity of material which is only very faintly colored, and, in cases when the solution was not very strong, it remained colorless. This colorless matrix is continuous with the *intertubular dentinal tissue*, while the intensely red germinal matter, or rather a prolongation from it, extends into the dentinal tubes. The germinal matter, with a thin layer of soft and imperfect-formed material, is easily detached from the formed material by which it is surrounded, and its continuity with the dentinal tubes may often be torn away. The whole then appears as an oval mass (cell) with a prolongation, as it were, into the dentinal tube.

"The general description given of the manner in which these dentinal tubes *open* upon the walls of the pulp cavity is certainly true, but it is true only of the dry tooth. In the living tooth a prolongation from one of the 'cells' on the surface of the pulp is prolonged into each tube. The tubes cannot, therefore, serve as mere conduits for nutrient fluids which transude through the walls of the vessels, and are supposed to pass along the tubes to the outer part of the tooth. Moreover, in some cases, certain of the so-called dentinal tubes are completely solid, the tube being obliterated.

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* Kölliker's Manual of Microscopic Anatomy, page 307.

"The specimens which have been sent round prove, the lecturer thinks, that the formation of the dentine and the so-called tubes is effected in a much more simple manner than is usually believed. The elongated masses of germinal matter first of all produce *formed material*, which gradually increases, as in other cases, upon the outer surface of the germinal matter. The formed material of the adjacent elementary parts is continuous, and calcareous matter is first deposited in the oldest part of this formed material. The calcareous matter appears in the form of small globules, which gradually increase in size and often several coalesce. Thus the formed material or matrix of the dentine becomes calcified.

"Not unfrequently, however, several of the calcareous globules increase in such a way as to inclose a portion of uncalcified matrix. This being, as it were, imprisoned by hard, impermeable structure, retains its soft, primitive state. If the tooth be dried, the soft matrix in these spaces shrinks, and air rushes in. Thus the appearance known as 'globular dentine' is produced, and the reason why uncalcified tubes are seen traversing these spaces becomes manifest.

"After the matrix of the dentine is calcified, the germinal matter still slowly undergoes conversion into formed material, which in its turn becomes impregnated with calcareous matter. The germinal matter diminishes in thickness. The formed material is produced more slowly after the general basis has been laid down, and hence the dentine immediately surrounding the tube seems to be distinct from that lying in the intervals between the tubes. The germinal matter gradually shrinks from the outer part of the dentine (the oldest portion) toward the pulp cavity, where these changes still go on. In the dry tooth the same fact may be expressed by saying that the narrowest part of the dentinal tubes is at the circumference of the dentine, and this part was the first formed; the widest part is that which is in contact with the pulp, and this is composed of dentine most recently developed. Internal to this is a narrow layer, the formed material of which is still soft and not yet calcified.

"The appearances described can only be demonstrated in perfectly fresh teeth which have been placed in carmine solution very soon after extraction.

"The principal changes in such a tissue as dentine seem to consist of the conversion of germinal matter into formed material, and the impregnation of this formed material with calcareous matter—rapidly at first, but more slowly as the quantity of calcareous matter increases. In the adult, the remains of the germinal matter slowly undergo conversion into formed material, and this slowly becomes impregnated with calcareous salts. In old age, although the pulp is very much reduced, this conversion is not complete, and a certain amount of germinal matter still remains in the tubes and in the pulp cavity from which the dentine might have been produced.

"*Stellate Tissue on Surface of Crusta Petrosa.*—Upon the surface of the fang of the tooth in contact with the crusta petrosa is a tissue of a very interesting structure, which takes part in the formation of the cementum. It is composed entirely of what may be described as branching cells, (elementary parts,) the processes of which anastomose freely with each other. It is from this tissue that the crusta petrosa is formed; but the lecturer alluded to it because it was a most perfect example of a tissue consisting entirely of cells, the cavities of which *communicate with each other by tubes*. The stellate cells are here as distinct as they are in the pith of a rush. But do these cells and tubes merely constitute an elaborate system of channels for the distribution of nutrient material to the tissue which intervenes between them? This tissue, it may be remarked, grows very slowly; it is a very low, simple form of tissue, and probably requires but very little nutrient matter. If the above view is adopted, it must be admitted that the means for nourishing the structure are far more elaborate than would be expected, supposing the conclusion is accepted that there ought to be a constant relation between the activity of change in a tissue and the mechanism for bringing new matter to the elementary parts and carrying off the effete material from them.

"Neither does it appear that all these bodies become lacunæ of the cementum. The stellate cells just described for the most part have not more than from ten to twelve processes or tubes projecting from them, while many of the lacunæ of the cementum have as many as thirty or forty; hence these tubes are certainly not an early stage of the canaliculi, and the cells cannot become lacunæ simply by the deposition of calcareous matter in the intervening matrix or intercellular substance.

"This stellate tissue on the surface of the fang, nevertheless, undergoes calcification. The process of calcification may be seen to take place in one of the specimens. The processes of the stellate masses become narrower and narrower, until the germinal matter which they contained, having undergone conversion into formed material, they ceased to be colored by carmine. They now look like roundish, highly refracting cords, which are colorless, and connect the several stellate masses of dark-red germinal matter with each other. Here and there, in the intervals between these processes, small globules of calcareous matter have been deposited, and these increase and completely surround the cord-like processes. Many of the processes gradually assume the character of the surrounding matrix, disappear as distinct cords, and, like the rest of the tissue, become impregnated with calcareous matter.

"Many of the stellate masses of germinal matter (cells) shrink and disappear, in consequence of the same changes having occurred. Others remain with their processes, and their nuclei possibly remain as the nuclei of the lacunæ which are irregularly distributed through the cementum; but Dr. Beale could not express himself positively on this point. It is certain that all the cells do not become lacunæ, for in this tissue there are half a dozen stellate cells to one lacuna in the cementum, and many of the canaliculi are five times as long as these tubes. Are these processes tubes? This question would doubtless be answered in the affirmative by every one who examined the tissue long after death; but during life they contain a solid or semi-solid substance, corresponding to that which occupies the so-called dentinal tubes. They contain portions of the germinal matter which is undergoing conversion into formed material, and the situations in which these tubes existed are the last portions of the formed material to undergo calcification.

"This is precisely the same change which takes place in the calcification of the dentine, the only difference being in the forms which the masses of germinal matter assume in the first instance. It need hardly be remarked that cementum, as it ordinarily exists upon the fangs of the human teeth, differs from true bone in its greater degree of hardness, in the small number and irregular arrangement of its lacunæ, and in the absence of the arrangement for its absorption and reproduction. It is a more permanent but less perfect tissue than bone.

"*Stellate Fibre Cells from the Aorta.*—Attention was next drawn to a very thin section of the circular coat of the aorta, colored by soaking in carmine, showing large stellate muscular fibre cells. It will be interesting to compare this with the tissue upon the fang of the tooth. The radiating processes seen in this specimen are clearly not tubular; the large stellate elementary parts were very readily separated from each other. The lecturer hoped it would be particularly remarked that in this specimen the central part of each is very darkly colored by carmine; external to this the structure is colored, but the color becomes fainter in the most external portions, and the outermost part of each fibre and its prolongations are perfectly colorless. The fibrous character of the tissue is sufficiently manifest. As in many other cases, the germinal matter is here seen in the centre of the mass, and is gradually giving rise to the production of formed material, the oldest and that which is perfectly formed being at the greatest distance from the central mass, while that which was but recently germinal matter, and is now in a transition state, is continuous with it. The latter is slightly colored with carmine, while the perfectly developed formed material is not colored at all.

"In concluding his sixth lecture, Dr. Beale remarked that the early formation of bone was not the least like the early formation of a tissue with stellate cells. In the former the so-called cells (masses of germinal matter with formed material externally) are round or oval at every period of their development, and may be separated from each other without difficulty. In the stellate tissue the masses of germinal matter are connected together for a considerable period of their existence; at first the points of communication are wide, but they gradually become narrower and narrower as the distances increase, and at last they are reduced to narrow processes which at length undergo conversion into formed material. The germinal matter of the different masses may communicate through these processes up to a certain period, but gradually they become more solid, and then the masses are distinct, but still connected to each other by narrow, cord-like processes.

"The nutrient material passes to the germinal matter of each mass, and to that prolonged to each *through* the formed material which is deposited in the intervals. In some stellate tissues fluid only exists in this situation, which is afterward absorbed, leaving spaces between the walls of the tubes into which air passes.

"The dentinal tubes and the tubes of the stellate tissues, therefore, do not correspond to the canaliculi of bone. Their counterpart is seen in many vegetable tissues, at the point where the separate masses of germinal matter are connected together; while the channels corresponding to the canaliculi are the pores which extend through the secondary deposits in vegetable cells.

"The stellate cells are stellate from the very beginning. The bone cell is never stellate at any period of its existence. The tubes in the first case contain germinal matter. The tubes in bone are merely spaces left between the particles of calcareous matter which are deposited in the matrix, and for this reason do not exist in the formed material of bone or cartilage prior to the deposition of calcareous matter. They are present when calcareous matter is deposited in cartilage. The dentinal tubes correspond to the processes from, and the cavities of, the stellate cells, but they differ entirely from the canaliculi of bone. The so-called tubes in the stellate tissue and in dentine are no more tubes than the space filled with germinal matter in an elementary part—say of the cuticle—is a cavity. Spaces remain, if the germinal matter is removed; but during life, these so-called tubes and spaces are occupied with the most important part of the whole structure—the living, active-growing germinal matter. The canaliculi of bone, therefore, do not correspond to the above tubes or spaces; they do not contain at any period of their formation germinal matter. They are mere channels left during the deposition of calcareous particles in the formed material.

"These channels in bone are, no doubt, subservient in a very important degree to the rapid changes which occur in this hard tissue. The bone tissue could not be so rapidly formed or so quickly removed, if it were not freely permeated by canals. In dentine the formed material becomes much more slowly impregnated with calcareous matter and incorporated with the organic matter, so that a very hard, even, and very permanent structure results, in which pores exist only in certain parts, especially in the granular layer of the dentine.

"In all cases the formed material is impregnated with calcareous matter from without inward. The necessity for the existence of bone at a very early period of development, the gradual alteration in the size of the bones during the growth of the body, and the changes in their form seem to be incompatible with a mode of development like that by which dentine is produced.

"While Virchow has been led by his researches to the conclusion that nutrient tubes exist in connection with cells in soft tissues, the results of Dr. Beale's observations have compelled him to conclude that such tubes do not exist in soft tissues as tubes for the transmission of nutrient material, and that even the so-called dentinal tubes are not nutrient canals; while it appears that the canaliculi of bone which are of this nature do not correspond to the dentinal tubes, nor to the communicating system of channels in a tissue composed of stellate branching cells, but are mere spaces left during the rapid formation of a tissue impermeable to fluids."

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Value of the Teeth in Determining the Anatomical Characteristics of Animals.—DR. ROBERT KNOX makes the following instructive remarks upon this subject in one of his able papers on the Philosophy of Zoology, in the *Lancet:* "In some natural families the external characters of the species are well marked, while those of the interior—that is, the anatomical differences—are exceedingly trifling, or at least obscure. This, like most facts in zoology, cannot be predicted or known *à priori*, and thus the skeleton will seldom or ever suffice to enable man to restore the exterior of the extinct world.

"The natural family of the dog, for example, is one of those which the zoologist is compelled to characterize by the exterior, the interior or the anatomical being wholly inadequate to distinguish the species. Compare the wolf, dog, and fox; see how trifling are the differences in their skeletons, teeth, and other anatomical differences; look at them alive, when clothed with the exterior. Who mistakes the one for the other? The domestic dog itself, composed of several species no doubt which it would be difficult now to determine by his character of domesticity, is influenced by circumstances which prevail not with those species as the wolf and fox, whose *naturel* is incompatible with domesticity.

"The horse (Equus) is another of those natural families, in the determination of whose species anatomy is at fault, or renders little aid when compared with the characters derived from the exterior. As regards the skeleton and the dentition, the horse and ass differ so little that the differences are scarcely appreciable; with the exception, indeed, of the nasal bones, no positive conclusions could be drawn from them. Now, look at the exterior of the living animal, and say who could mistake them? I have not recently examined the skeletons and dentition of the other species of the natural family Equus—the zebra, for example, and the quagga—but doubt not that the same remarks apply to all. The zebra described by Burchell rests wholly as a distinct species of horse on its external characters. Had the natural family Equus perished, and been found in a fossil state, the most gifted anatomist or zoologist in the world could not have restored a single species; nay, what is more, the anatomical characters would have wholly misled him in his determinations. It is the same with the lion and tiger, leopard, panther, etc.; their anatomical differences which exist notwithstanding, are extremely trifling. It may be owing to the character of my studies that I still look on them as important; but be this as it may, they do not enable us to decide on species, much less to restore the extinct or fossil world. The fossil carnivora were neither lions, nor tigers, nor panthers. Neither did the fossil horse strictly resemble any now existing. It belonged to the same natural family no doubt, but the species was distinct. When fossil man shall be discovered, his affiliation with existing mankind will no doubt be manifest; but like the fossil carnivora, solidungula, etc., the species will be found to be different and unrestorable; neither anatomist nor zoologist will be able to put him in his place.

"It is said of the domestic animal, the pig, that when suffered to run wild, it returns to the zoological form of the wild pig. Now, this assertion I wholly disbelieve. The domestic cat and the wild differ specifically; but this is not to be proved readily by their anatomical characters. The exterior decides the question at once. They differ essentially in nature as well as their exterior; nor is it probable that, under any circumstances, the will cat would ever become as the domestic. * *

"How do these remarks apply to the natural family called Man? He is by his character within the influence of domesticity. This affects him less than might at first be imagined; still, it has its influence. Composed of many species, distinct anatomically from each other, he is best known by his external characters, which in him are as strongly marked as in any natural family. The anatomical differences are constant and at times striking; but, as regards the skeleton and the dentition, would not enable the zoologist, under any circumstances, to distinguish with any nicety the species of an extinct race of men. Supposing the Coptic race to have become extinct, who, from their skeletons, could have placed before us the original Copt as revealed by the drawings in the tombs of Karnac, by the bust of Amenoph II., and other monumental records now existing? Who, from the skeleton of the Bosjieman female *alone*, could have predicated the form, described the character, of the living race as I have seen them on the arid plains of Southern Africa? Or who, had all the tribes of Israel become extinct, and all traces lost, saving their skeletons, could have reconstructed the descendants of Abraham as we now see them? By what art, unknown to me, could the zoological historian, who boasts so much of his tact and ability to reconstruct a dead world, have divined the elongated eyes, jet-black hair, enormous development of the vestibule of the nose, widely-extended mouth, negro-like lips, and receding chin, of the sons and daughters of Israel now alive? Who could have predicted their *naturel?*"

Osteology and Dentition of the Natives of the Andaman Islands. In an abstract of a paper upon this subject, read before the Ethnological Society of London, the *Med. Times and Gaz* says that "PROFESSOR OWEN commenced by a brief notice of the geography of the Andaman Islands, and condensed an account of the physical characters and habits of the natives, from the 'Reports' of the able superintendents and surveyors of the convict settlements, recently established by the East Indian Government on these islands: quoting more particularly from the statement of a Brahmin Sepoy, one of the transported mutineers, who, after escaping from the convict establishment, passed upwards of a year (from April 23, 1858, to May 17, 1859,) with a tribe of Andamaners. His statement accorded with previous accounts that the diminutive black aborigines of these islands have no notions of a Deity, of spiritual beings, or a future state; that both sexes go naked without any sense of shame. There is promiscuous intercourse, save with the parent, which only ceases in regard to the woman, when she is allotted as wife to a man, but is retained as the prerogative of the male sex. 'It is impossible,' writes Dr. Mouatt, Inspector-General of Jails, Calcutta, 'to imagine any human beings to be lower in the scale of civilization than are the Andaman savages. Entirely destitute of clothing, utterly ignorant of agriculture, living in the most primitive and rudest form of habitations, their only care seems to be the supply of their daily food.' The chief weapons of the Andamaners are bows and arrows; some of the males also carry a kind of spear. Scarification of the skin in certain maladies, tatooing, and shaving of the scalp are performed by chips of glass skillfully detached from bottles cast ashore after wrecks, by sharp blows with a stone. The iron with which the arrows and spears are headed is also obtained from wrecks. The Andamaners appear to be devoid of fear: they are powerful for their size, can carry greater burdens than the Hindoos; are swift runners, and clear rapidly, by jumping, the fallen trees of the jungle and rocks of the tidal shore. As climbers they are little inferior to monkeys, being used from childhood to climb the lofty, straight, unbranched trees of the forest in quest of fruit and honey. They are excellent swimmers from their childhood, and wonderful divers 'fishing for shell-fish in deep water.' 'I have seen,' deposes the Sepoy, 'three or four of them dive into deep water and bring up in their arms a fish six or seven feet in length, which they had seized.' 'They could perceive canoes approaching long before they were visible to me, and could see fruits and honeycombs in the jungle which I could not. Their vision penetrates to great depths in the sea, where they could see and shoot fish with arrows, when the object aimed at was not apparent to me. They see well at night, catching fish in the pools left by the tide at that season; and shooting the wild pigs which came to the coast to drink by night.' By their acute sense of smell they often detect afar off the existence of fruit in the neighboring lofty trees. 'I never met with any one affected with gonorrhœa, syphilis, itch, piles, small-pox, or goitre; but I have seen them affected with vomiting, colic, diarrhœa, intermittent fever, headache, earache, toothache, abscesses, rheumatism, catarrh, cough, painful and difficult respiration. The only remedies I have seen used are "red earth rubbed up with turtle-oil," a cold infusion of certain aromatic leaves, the wetted leaves being applied to the head or other inflamed parts, and local bleeding, by sharp splinters of bottle glass. They spin ropes, make wicker baskets, large nets for catching turtle, smaller nets for catching fishes; and they scoop out their canoes by means of a small kind of adze, tipped by a semicircular blade of iron. Thus, for all their immediate wants, invention has supplied the instruments called for by the nature of the surrounding objects and sources of food. But their life is little beyond that of the brute animal; and the low grade of humanity, with the dwarfish stature and black color of the Andamaners, have always made a further knowledge of their physical characters peculiarly desirable. Professor Owen was enabled to contribute the present notice of the osteological and dental characters, by the opportunities kindly afforded him by Dr. Fred. J. Mouatt, Inspector of Indian Jails, who had brought over the bones of an adult male native of the Andamans, now presented to the British Museum. The proportions of the bones indicated a well-formed, robust, adult male, of four feet nine inches in height. The characters of this skeleton, especially of the cranium and teeth, were minutely detailed, and illustrated by drawings and diagrams. The skull is well formed, of the oval type; forehead rather low and narrow, and jaws slightly prognathous; differing very decidedly from the Negro, Papuan, and Australian types; and in a minor degree from the Malayan and Mongolian forms. It is characteristic of a race to which some of the scanty dwarf aborigines of Java and Borneo offer the nearest resemblance. Professor Owen finally submitted the following remarks on the question of the source whence the Andaman Islands might have derived their native race. He first offered a warning against the assumption that the Andamans were as they now are when they received their first human inhabitants, and entered upon an explanation of the geological and geographical evidences of great changes in the relations of land and sea in that part of the world. 'The cardinal defect of speculators on the origin of the human species was the assumption that the present geographical features of the earth's surface preceded the origin of such species.' The Monogeneist, on that assumption, bent on tracing all the human races from one source and one existent centre, exaggerates the application and value of casual remarks to show, *e.g.* 'that the Australians are not a pure race, but hybrids between true Negroes and Malays,' a proposition which the author held to be refuted by osteological and dental characters. The Polygeneist, on the other hand, invoked a separate creation of each race for each existent continent or island home of such race. The important considerations of previous changes of land and sea, coeval with human existence, are here left out of sight. Antecedent generations of the dwarf Andaman race might have coexisted with the geological changes that have obliterated the continent of their primitive origin. In every essential human physical character, the Andaman race participates with their more intellectually gifted brethren. They offer no mark of specific distinction. The size of the brain would indicate aptitude for civilization."

"*Amalgams.*—The word amalgam is of Arabian origin, but is sometimes derived from the Greek *malagma.* It always designates a compound or alloy of mercury with other metals, not only in indefinite proportions, for there are good reasons to suppose that most or all metals may be made to form regular chemical compounds, which in many instances appear in a crystallized state. Some of the latter are obtained by passing the thick amalgam of the metal, which must be considered to be a solution of the crystalline compound in an excess of mercury, through leather, when the latter will pass through with but little of the other metals, the solid compound remaining behind.

"Among these alloys those with zinc and with tin, and to some extent also with copper, are of importance; and also, though in a less degree, the compound amalgams with tin and cadmium, and with tin, silver, and gold. The amalgam which mercury forms with zinc is applied principally for the protection of the zincs in the galvanic battery. For this purpose the mercury is either rubbed on with a soft rag moistened with dilute muriatic or nitric acid, or the sheet zinc is placed in a vessel the bottom of which is covered with mercury, and this with the dilute acid. A crystalline amalgam of zinc containing 6 equivalents of zinc to 5 of mercury, (2 parts to 5,) sometimes forms on slowly cooling a liquid amalgam of the two metals. One part of zinc to four of mercury is the brittle mass which is used as amalgam for the cushions of the electrical machine.

"From the solutions of mercury, zinc does not precipitate an amalgam with mercury, with the exception of that of corrosive sublimate when acidulated with hydrochloric acid.

"Liquid amalgams of zinc are best formed by pouring the mercury in a thin stream into a vessel with zinc which has just been melted and about to congeal.

"Amalgam of tin forms readily by introducing the solid metal into the mercury. In this way hexagonal crystalline formations have been observed; there is always a decided contraction in bulk. The tin amalgam is fastened on mirrors by first spreading the tin-foil on a flat horizontal surface with raised edges, and covering the same with a stratum of mercury; any film of impurities or oxide must be carefully removed from the metal, the plate of glass is then placed in the mercury, avoiding the interposition of any air bubbles, and pressed down by weights placed on it.

"The hard amalgam of tin obtained by passing the liquid amalgam through fine leather, then drying, and afterward rubbing under water, forms one of the plastic cements for filling teeth. It hardens within a few days, and is besides used for hermetically closing glass tubes. Mixed with a little silver amalgam it is a less plastic mass and requires a little more mercury, but it hardens much sooner.

"Copper amalgam is best obtained by first precipitating metallic copper in a fine state of division from a solution of three ounces of blue vitriol in a quart of water mixed with an ounce of oil of vitriol, by means of clean wrought iron; then, after washing it thoroughly with hot water, moistening the powder with a solution of proto-nitrate of mercury, and finally incorporating it under water in a mortar with the required quantity of mercury. This amalgam, like the hard amalgam of tin, has the property of being softened and rendered plastic by mere trituration with a pestle. The proportions are generally 3 parts of copper to 7 of mercury.

"Similar properties belong to the compound amalgam of tin and cadmium, which are fused together in the proportion of two to one, and mixed with warm mercury in excess, which latter is removed by pressure when cold. Mixtures of tin, gold, and silver are prepared and used in a similar manner. They are, or have all been, used for filling teeth. Fusible metal forms an amalgam with one-sixteenth of its weight of mercury, which fuses far below the boiling point of water; cadmium increases the fusibility still more. A mixed amalgam for injecting anatomical preparations, which is hard at ordinary temperature but becomes soft at 150° Fahr., and fuses at 176° Fahr., consists of 20 parts of bismuth, 12 of lead, 7 of tin, and 4 of mercury.

"The silver coating of glass beads and those large-sized glass ornaments now in fashion, is produced by shaking within them an amalgam composed of 8 parts bismuth, 5 of lead, 3 of tin, and from 7 to 9 parts of mercury.

"A mixture of 2 parts of tin and bismuth each, and 1 of mercury, when powdered, is used for painting as imitation silver bronzes. Various combinations of tin, zinc, with or without bismuth, are also used for the same purpose as the zinc amalgam on electrical machines.

"The *Arbor Dianæ*, which forms when mercury is introduced into a solution of silver, is an amalgam of that metal. The solution of silver must not be concentrated but somewhat acid.

"The solid amalgam of gold contains an equivalent of gold to two of mercury. Other proportions are used in gilding.

"The amalgams of the alkaline metals are remarkable for their hardness, though the metals sodium and potassium themselves are quite soft at the ordinary temperature. One per cent. of sodium in mercury produces an amalgam which is liquid, but still quite thick, and one-half per cent. of potassium renders the mercury still more so. A very hard compound is that consisting of 200 parts of mercury, 10 of potassium, and 1 of sodium.

"By means of the alkaline amalgams, most other mercurial alloys may be produced by introducing them into the solution of other metals. Zinc amalgam is likewise used for the purpose."—(*Amer. Drug. Circular.*)

On Gold.—The following remarks upon this metal, copied from the London *Mechanics' Magazine* by a contemporary, are of much practical interest: "From very ancient times it has been the practice to divide the ounce troy of gold into twenty-four imaginary parts. An ounce of pure gold, therefore, and what is called twenty-four-carat gold, are identical terms.* Anything less than twenty-four-carat gold indicates that in an ounce weight of that substance there are so many twenty-fourth parts of pure gold, and that the remaining portion of an ounce of it is made up of an alloy of some inferior metal—usually copper. Except for wedding rings, which are, or should be, made of standard gold, consisting of twenty-two parts or carats of pure gold, and two of copper alloy, jewelers seldom use gold of a higher rate of purity than eighteen carat. How often they use it of a much lower degree of fineness, they know best.

"There is no doubt that it is possible to give almost any color to gold, by the addition of particular alloys, and of late, ingenuity has been at work to give the sixteen-carat gold the appearance of pure gold. This is done by the aid, partly, of what is technically known as the coloring pot, in which the metal is treated to an acid bath of a certain amount of strength. By the judicious use of this contrivance, twenty-two-carat gold may be made to resemble very closely native gold, as found in the shape of nuggets in California or Australia. Nuggets are never, however, found to be pure gold; they consist for the most part of twenty-three or twenty-three and a half carat gold, the fraction being made up of an alloy of some inferior metal. In order to test the purity of gold, the application of heat is perhaps one of the simplest means. Pure gold will not be in the least discolored by it, while twenty-three-carat gold will take a slightly red tint. There is this disadvantage about the mode of testing suggested, it will certainly discolor very materially all gold of degrees of fineness inferior to that of twenty-three carat, and nothing but the acid bath will restore it to its original hue. In order to effect this latter operation on a small scale, nothing more is necessary than to obtain an earthen pipkin or gallipot, place the article in it, cover it with nitric acid, and hold it over a spirit or gas lamp, or even a candle, until the acid boils. The result will be that the metal will be restored to its original brightness.

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* Twenty-four-carat gold means pure gold without regard to quantity.

"As regards the testing of the genuineness of gold coin, there is nothing equal in simplicity or efficacy to weighing it. It is impossible that any metal inferior to standard gold can be used in the manufacture of counterfeit sovereigns or half sovereigns which will give pieces, of the same size, of equal weight.

"The testing of 'jewelers' gold,' when used in the manufacture of many kinds of trinkets, is a matter attended with considerable risk and difficulty, and perhaps the only means readily at the command of the purchaser for insuring a proper relationship between quality and price in such cases, is to ascertain the respectability of the seller."

On the Oxidation of Iron.—By M. FRED. KUHLMANN. "I believe I have before proved that when a spot of rust is produced on iron this spot causes a corrosion which gradually penetrates to the interior of the metal; that the extension of the spot is not the result of direct combination of new parts of the metal with atmospheric oxygen, or oxygen resulting from the decomposition of water; but that it is the result of a more complicated cause, in which the oxide of the first formation is the principal agent. The parts of the metal in contact with the peroxide take away a third of its oxygen, forming at its expense protoxide of iron, which by a subsequent absorption of oxygen borrowed from the air passes in its turn to the state of peroxide.

"It results from this succession of effects that the peroxide of iron is in an unstable and transitory state of equilibrium, by turns partially reduced and reoxidized. For the production of this succession of reductions and oxidations it is necessary that the oxide should be in the state of peroxide, for were it only in the state of magnetic oxide, the oxidation would not spread to fresh parts of the metal. A covering of magnetic oxide, instead of inducing alteration, would be, on the contrary, a most efficacious preservative against oxidation. Such is the opinion of M. Thiraut, of Saint-Etienne, who first succeeded in utilizing this property. His process consists in rusting the surface of iron artificially, and then changing the peroxide to the state of magnetic iron, probably anhydrous, by plunging the oxidized pieces into water at 80° or 100°.

"'Under these circumstances,' says M. Thiraut, 'a new phenomenon is produced. No more peroxide is formed. In fact, the peroxide itself is modified, and magnetic oxide Fe_3O_4 is formed. This magnetic oxide being almost unalterable, and no longer forming a voltaic element with the iron, the metal when covered is preserved from oxidation.'

"Some experiments previously described by me support this opinion, and show that magnetic oxide is the most stable of all the oxides of iron, best resisting in contact with the water the deoxidizing action of certain bodies and the oxidizing of others. Moreover, this is the opinion already generally accepted by geologists."—(*Chemical News.*)

"*Indian Method of Fixing Loose Teeth.*—Dr. Roberts remarked," at a meeting of the Medico-Chirurgical Society of Edinburgh, "that it was well known that the natives of India were in the habit of tying loose teeth to sound ones, by means of gold wire, arranged in the form of a figure of 8, and he had seen various preparations illustrative of this practice. He had never, however, seen so remarkable a preparation of the kind as the one which he now exhibited to the Society. It had been removed from the mouth of a native queen, and sent home by a former pupil, now settled in Madras. The preparation consisted of the whole of the teeth of the lower jaw, which had been removed in one piece, and were attached to one another by gold wire. Complete absorption of the alveolar processes had taken place, and the only points by which the teeth were connected to the jaw were the ends of the roots of the wisdom teeth. The roots of the central and lateral incisors were incrusted with tartar, and all the teeth were of a black color, owing to the practice of chewing beetle-nut, and other preparations. The teeth of the upper jaw had all fallen out, although they had all been tied together in the same way and at the same time (eight or nine years ago) as the under teeth. A complete artificial set had been fitted in, and given much satisfaction. Dr. Roberts showed two smaller preparations of teeth attached together in a similar manner, which had been removed from the mouth of a native pleader.

"Dr. George Smith stated that the practice of attaching the teeth together was very common in Madras, and that he had frequently seen examples of the practice, but never on such a large scale as in the preparation shown by Dr. Roberts. The natives also were in the habit of ornamenting their teeth with gold; they bored little holes in the central incisors, and filled them up with gold."—(*Edinburgh Medical Journal* and *Dublin Medical Press.*)

"*Making Steel from Iron with Gas.*"—An exchange says that "about twenty-five years ago Mr. C. McIntosh, a manufacturing chemist in Glasgow, Scotland, made several tons of cemented steel by submitting iron, at a dull-red heat, to the action of lighted gas, operating with from 100 to 150 lbs. at a time, the iron bars being two inches broad and quite thin. The cementation took from eighteen to twenty hours; and when the operation exceeded that time supercarburation took place. Thus, by the sole action of lighting gas, without mixture of any foreign body, it is possible to obtain either steel or cast iron; it is only a question of time or temperature. To obtain steel there is no need to add ammonia previously in order to nitrogenize the iron. Steel and cast iron differ only in containing diverse proportions of the same elements, as pure white cast iron can be tempered, and even forged like steel; witness the white cast iron of Lieges used for making screw plates."

"*Extraordinary Ductility of the Bessemer Steel.*"—It is stated (*Ibid.*) that "at a recent meeting of the Manchester Literary and Philosophical Society, Mr. Brockbank exhibited some samples of steel manufactured by Mr. Bessemer's process. These specimens have been bent and twisted cold, and showed a remarkable degree of ductility. He stated that the Bessemer steel was one of the most plastic and manageable of metals—more so even than copper. It could be bent, flanged or twisted, either hot or cold, without annealing, and over a considerable range of temperature—which is not the case with ordinary steel or copper. A plate of 18 inches diameter had been forced through a series of dies until it formed a tube 13 feet long, and 1¾ inches diameter, without any crack or flaw. A ring of metal could, at one heat, be hammered into a die to form a locomotive engine chimney top. In drilling a circular hole into a plate continuous shavings are formed—whereas, in copper or Low Moor plates, or any other metal, the shavings break into pieces, one-sixteenth of an inch long. Thin sheets of the Bessemer soft steel can be bent backward and forward hundreds of times without a fracture, and are almost as malleable as paper."

"*On the Tenacity of Metallic Cobalt.*—The quite recent discovery of the exceeding tenacity of metallic cobalt, *which is double that of iron*, promises to place this metal in the first rank of mechanical utility. Oxygen being cheaply attainable, its ores will, in all probability, be smelted, and the metal produced in large quantities; and should a cobalt steel exist, bearing similar relations in its qualities to those which ordinary steel bears to iron, there seems no limit to the improvement of our tools, engines, and every fabric in which lightness and strength have to be combined.—(Note to Sir John F. W. Herschel's treatise on Physical Geography, bearing date April, 1861.)

"In order to appreciate the importance of this discovery, it must be borne in mind that iron has been heretofore regarded as the most tenacious of the metals, and that copper, which ranks next to it, has but half its tenacity. D. B. S."—(*Amer. Jour. of Pharmacy.*)

"*Ovarian Cyst, containing Hair, Teeth, etc., presented to the Boston Soc. for Med. Improvement.*—Dr. Jackson showed the specimen, which he had received lately from Mr. James Ross, a medical student, and which was taken from a middle aged, dissecting-room subject. It was about two-thirds as large as the fist, and was filled with a soft, yellowish fatty substance, with which was mixed a large quantity of loose hair. Upon the inner surface there was to some extent a pretty well-marked coarse cutis, with some remains of cuticle; but only a single hair was found attached. Near the skin, and just beneath the inner surface of the cyst, was a piece of bone, one and a half inches long, in connection with which were two teeth. Two or three quite small cysts were connected with the larger one. The other ovary upon the left side was about half as large as the above, and consisted of a number of cysts, all of which contained fat, and in one of which there was hair, with traces of skin, but nothing further. Dr. J. remarked that he had never but once before met with a recent specimen of teeth in an ovarian cyst."—(*Boston Med. and Surg. Jour.*)

Preservation of Organic Structure for Microscopical Investigation.—The Florence correspondent of the *Med. Times and Gaz.*, in his account of the Italian exhibition in that city, gives the following of interest to microscopists: "Professor Pacini's micrographic preparations have the advantage not only of being unalterable, but also of rendering the various histological elements more distinct and more easily amenable to microscopic examination. Professor Pacini employs the following eight solutions:—

	I.	II.	III.	IV.
Corrosive sublimate	1	1	1	1
Chloride of sodium	2	2	1	—
Distilled water	100	200	300	300

	V.	VI.	VII.
Corrosive sublimate	1	1	1
Acetic acid	1	3	5
Distilled water	300	300	300

	VIII.
Corrosive sublimate	1
Phosphoric acid	1
Distilled water	300

"No. I. he uses for all vascular tissues of the human body or warm-blooded animals, such as pieces of an hyperæmic peritoneum, villi of the placenta, etc.

"No. II. for the corresponding tissues of cold-blooded animals.

"No. III. for cells, pus, infusoria, spores.

"No. IV. is to be substituted for No. I. in all cases where the blood-globules, which are so easily destroyed by chloride of sodium, are to be preserved intact.

"No. V. is sometimes preferable to III., the acetic acid rendering the nuclei more distinct.

"No. VI. is to be used for all fibrous tissues, muscles, and nerves.

"No. VII. for glands; and

"No. VIII. for cartilages, etc.

"Signor Pacini has promised to publish a *brochure* on the subject, which will, no doubt, be welcome to all friends of microscopical researches."

MISCELLANY.

In the course of a review of M. I. G. St. Hilaire's elaborate work on the Systematic Position of Man in the Organic Kingdom, a writer in the *Natural History Review* (Jan. 1862) states that in considering the character of the teeth of man, M. St. Hilaire adverts "to the well-known fact that the principal difference from the dentition of the apes lies in the shortness of the canines, and the consequent absence of that diastema or interval between the incisors and canine in the upper jaw, and the premolars and canine in the lower jaw, which is present in the apes; and repeating the statement of Cuvier, that a similar equality and serial continuity of the teeth are only to be met with in the *Anoplotherium*. However, an approximation to these characters is found also in some of the Insectivora, animals far more closely allied to the Primates than is the fossil ungulate."

In an interesting paper on the Sumatran Elephant, a translation of which is given in the *Nat. Hist. Rev.*, the author, Prof. H. Schlegel, among other marks of distinction between the different varieties of the elephant, refers to that afforded by "the laminæ of the teeth, which, however, is less apparent to the eye than that taken from the number of the vertebræ. These laminæ, or bands, in *E. sumatranus* are wider (or if one may say, broader in the direction of the long axis of the teeth) than in *E. indicus*. In making this comparison one must remark that the distinction is less evident in younger individuals, and that there are met with in all species of elephants, within certain definite limits, remarkable individual differences in respect of the width of these laminæ."

In a letter to the *Dublin Med. Press*, upon the causes of danger from the pulmonary administration of chloroform, DR. C. KIDD refers to the impurity of this agent as a probable source of evil in some cases, and the necessity of always testing it before inhalation. In relation to the comparative value of ether and chloroform as anæsthetics, he says: "There have been forty-one fatal accidents after ether, yet I believe it is probably one-third or one-half again more safe than chloroform. All the evidence we have (and it is now very extensive) goes to show that ether is dangerous in all operations, such as ovariotomy, lithotomy, large amputations, where there is reason to fear secondary hæmorrhage. One case to the contrary, by Mr. Spencer Wells, argues nothing; but ether is much more valuable than chloroform in operations about the face, as the anæsthesia lasts longer from ether, and we are not obliged to keep the inhaler over the face. Ether is more valuable in reducing dislocations, also by its remarkable effect in relaxing muscles, and ether will often in strangulated hernia act like a charm, so as to do away with the necessity of the cutting operation."

The *Med. Times and Gaz.* says that "at a meeting of the Odontological Society of London, on February 3, 1862, MR. COLEMAN reported a case of exfoliation of the right intermaxillary bone with its contained teeth from a child who had suffered from measles The particulars of the case had been furnished him by Dr. Hughlings Jackson; he then read a paper on 'Anæsthesia considered especially in reference to Dental Operations,' in which he said that while it was not advisable in the case of the removal of one or two teeth only, he considered it humane to recommend it where four or more teeth were to be extracted."

"The adulteration of beeswax by Japanese wax is detected, according to HAGER," (*Chemist and Druggist,*) "by the different behavior of the two bodies in a concentrated solution of borax, at the boiling point. Beeswax is totally insoluble in such a solution, while Japanese wax dissolves, and on cooling forms a milky-white gelatinous mass. From a mixture of the two the latter is dissolved out, carrying with it a portion of the former, while another portion rises and congeals on the surface."

The following method is said (*Cosmos and Chemist and Druggist*) to be very efficient in removing the discoloration of the skin from nitrate of silver: In twenty-five cubic centimètres of water dissolve from five to six grammes of iodide of potassium, then add iodine in scales until the liquid assumes the dark-reddish color of bromine. Place with a glass rod a small quantity of this liquid on the discolored spot, and in a few seconds touch it with hyposulphite of soda, which will remove both the silver stain and that of iodine.

In a communication to the *London Pharm. Jour.* on some of the applications of carbolic acid, DR. F. GRACE CALVERT gives (*Amer. Jour. Pharm.*) the following observations of Mr. Thos. Turner on some of its medicinal properties: "It may be advantageously used as a solution of one part of acid in seven parts of water, in fetid, ill-conditioned ulcers. It alters the action of the blood-vessels, causing a purulent instead of a sanious discharge, and destroys almost immediately the offensive smell of the secretion. In ulcers having a communication with carious bone, or even necrosis, (where the bone is dead,) it has in its diluted state a good effect when injected into the sinuses leading to the diseased bones. When there is mere caries or ulceration of the bone it effects the healing process, and in necrosis it promotes the exfoliation of the dead portion. * * In gangrenous and all offensive sores it removes all disagreeable smell and putrescency, and may render the discharge innocuous to the contiguous living and unaffected tissues. In its diluted state, therefore, it is a great boon to patients laboring under that class of disease."

The editor of the *Amer. Druggists' Circ.* gives the following method of preparing "Monsell's Salt" or persulphate of iron: "Take 556 grains (or more in proportion) of pure crystallized protosulphate of iron, dissolve in six ounces of water in a porcelain dish over the lamp, and add one drachm (by weight) of oil of vitriol; then heat to boiling, and add, drop by drop, nitric acid as long as a black color is produced which disappears on boiling. On account of the effervescence with which this disappearance takes place, the dish must hold at least three times the bulk of the materials. When no more change is produced by dropping in the nitric acid, and when a slip of paper, just moistened with a solution of protosulphate of iron is no longer colored dark when held close over the surface of the boiling reddish-brown liquid, it is reduced by continued evaporation either to dryness, or to the bulk of 556 grains of water, (one fluid ounce and 1⅔ fluid drachm.")

It is stated (*Ibid.*) that "the coloring of creosote, pyroligneous acid, and oil of tar, are due to a red crystalline coloring matter, which was described by Reichenbach, and called cedriret. He obtained it by neutralizing the acid of the oil from wood tar with carbonate of potash, then treating with caustic alkali, and distilling the remaining oil. The second third of the distillate yields the red crystals by being mixed with a solution of sesquisulphate of iron, or of bichromate of potassa and tartaric acid. Others have not been able to obtain this compound."

According to the *Verein z. Beförd d. Gewerbfl.* for Prussia, (*Ibid.*) "Mr. Maudslay, an English engineer, has invented a process by which glass can be worked on the bench like any metal with the same tools, and can be drilled, turned, and planed, merely by keeping the tools, as well as the glass, moistened with dilute sulphuric acid."

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On Bandaging and other Operations of Minor Surgery. By F. W. Sargent, M.D. New Edition, with an additional Chapter on *Military Surgery*, by W. F. Atlee, M.D., and one hundred and eighty-seven Illustrations. Philadelphia: Blanchard & Lea, 1862.

This is a new but not a revised edition of a standard work on minor surgery. It affords much useful information on a variety of topics of great practical interest to the medical student and practitioner, though in some respects it does not seem to be up to the knowledge of the day. The addition of a chapter on military surgery enhances its value more particulary at the present time.

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, MAY, 1862. No. 10.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

We remarked, in our last article on plugging forceps, that some dentists do not or cannot plug teeth well on the back parts. We have had four or five examples recently of this kind of failures. For one patient, seven plugs between the teeth have fallen out within one year. These plugs fell out perhaps for three reasons—proneness of the teeth to decay, want of sufficient hold for the plug, and compactibility of the gold; but the latter was the greatest cause, at least we think so from the fact that where there was still a portion of the gold remaining, it was soft, *water-soaked;* hence *capillary attraction* must be overcome to a great extent or the gold will finally be displaced. We do not mean to be understood that the crystal foil requires the forceps, as it is used in such small portions, and consolidated as it is introduced into a cavity; but we cannot, nor do we ever expect to use crystal foil when it requires a long time to make a plug and keep it dry all the time, especially between the teeth or on the lower jaw. To save time to both the patient and ourselves, in difficult localities, between the teeth and on the buccal surfaces, we use, as a general rule, common foil. *Economy of time* is the great desideratum of the present day, in everything that is to be done by human fingers. There are some people still left in this rapid age who think that *slowness* means *completeness*—let them alone, they will die so.

But the plugging forceps is the only *machinery* that we know of that can be brought to bear in putting plugs in teeth. They are indispensable in making a good plug between the teeth and the buccal and labial surfaces generally. Still much time may be saved by properly preparing the gold for consolidation before it is introduced into a cavity. It will not be out of the way to say here, that we hear a great deal said about *perfection.* We do not ever expect to attain to it. We are satisfied in making a plug as good as the tooth we put it in, instead of wasting time to ourselves and money to our patients, which work is *comparatively* worthless when done. Fig. 3 represents a forceps five inches and a half long, one flat and one pointed beak. We use it principally for the upper teeth, front or back parts of molars, bicuspids, and canines; when we think the plug is well consolidated with the ordinary plugger, we apply this forceps, and increase as much as we can the density of the plug, and we are quite sure we make better work than we could without it, and in less time. The condensing beak is a little longer than the counter beak, and slightly serrated on the point. This forceps cannot always be applied so as to reach the lower border of the cavity toward the neck of the tooth, but there is not as much necessity for it at that point as the middle of the plug and the border near the cusps of a tooth, because the gold can be packed more firmly near the gum when it is first introduced, with the ordinary plugger, since the pressure can be made more on a straight line with root than when the plug is further completed; the pressure then is made more across the shaft of the tooth, and again the plug is exposed more to the contact of substances which may tend to dislodge it at the crown border than toward the gum. Fig. 4 represents a forceps six inches and a half long, the handles well compressed, four inches from the beaks, so as not to be in the way of the chin when using it. It is used on all the front teeth, canines, bicuspids, and molars, as far back as it can be applied; the condensing beak is serrated and as small as an ordinary plugger for soft foil; the counter beak is flat, with a copper nail riveted in; it may not be necessary to use the copper in any of the forceps if the steel was of the proper temper and would stay so by use, but we originally thought it was best, and we have not altered it; these comprise all the forceps we use at present that is worth mentioning. We hope the profession will adopt them more than heretofore.

Fig. 3.

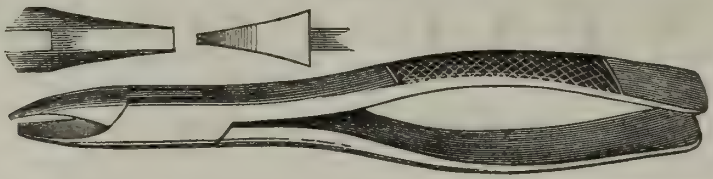
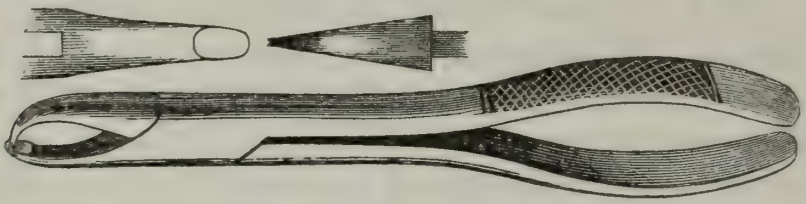


Fig. 4.



(To be continued.)

DENTAL FEES.

BY C. P. FITCH.

Do not be startled, gentle reader, at the simple announcement of this hackneyed topic, or permit an over-anxious mind to summon to your august presence for adjudication the thousand and one questions startled into being by the conflict of antagonisms concerning the claims of duty and policy, conscience and self-interest. This subject of dental fees is a creature of protean shapes, having no well-defined outline or definite proportions; and yet, perhaps, no subject has received so much thought, and none has been written upon and talked about with so much earnestness. With many, it is doubtless considered a sacred and forbidden theme, or classed with those subjects settled and labeled "Interdicted," and sacredly guarded by the expression "*noli me tangere*"—touch me not. It therefore needs to be handled gently, or not at all, through fear of *hurting somebody.*

I do not propose to present a lengthy catalogue of rules defining the *quid pro quo* and limiting the exercise of that distinctive feature of manhood, freedom of thought and volition, but wish merely to make a very few, plain, practical observations, or give expression to convictions and conclusions to which one is frequently, though it may be reluctantly, carried.

Fortunately, the remuneration which one demands and receives for the products of mind and manual skill, or, in other words, the maximum tangible equivalent which is a just reward for mental and physical toil, is determined and regulated to a great extent by laws and usages outside of one's self. A groundless assumption will not long be tolerated in any community, while real worth will always be appreciated and generously rewarded wherever and whenever submitted to the decisions of the impartial and intelligent. The great evil of the present, as well as of the past, is this: The counterfeit is often palmed off as the genuine, or worth and merit compelled to go on foot and through the mud, while arrogance and pretension ride in a liveried coach; but this happens to every age and to all peoples, and will most generally, though slowly, work out its own cure. Its sure and best antidote is found to consist in the prevalence of general and specific intelligence.

The price of most of the natural and artificial products is governed and settled by demand and supply. The determination, therefore, of equivalencies in dollars and cents, reverts to a healthy competition.

The common maxim that "a thing is worth what it will bring in market," is perhaps, in the main, right, with this proviso, that a fair and honorable exhibit of qualities be made at the time the transaction is consummated. With some the motto that "your eyes are your chap," is a cherished rule of theory and action. But the rule is founded in error, wrong in principle, dishonest in practice, and defeating its own ends by overreaching and claiming too much.

There are some things which have intrinsic value, and others which have relative and adaptive worth. Jewels and the precious metals have an intrinsic value, or, in other words, conventional usage has affixed a standard value to them ; and this valuation varies but little, and whenever interfered with demand and supply produce it. To a thirsty man, water has an adaptive value, and nothing will answer as a substitute. Gold, to one drowning, is not only valueless, but often making more sure and hastening the sad, destructive result. Bread, to one passing from exposure to cold, into the rigid sleep of death, is mockery. Under certain circumstances products and services become invaluable. Their worth exceeds any arithmetical computation. But under other conditions and surroundings they are worthless, and even burdensome. It is fair, then, to conclude that anything is important and valuable proportionately as it answers a given end. A beautiful piece of mechanism, costing thousands of treasure, and consuming weeks, months, and even years of toil for its completion, if it answer not the end designed, is comparatively a worthless thing. True, as a highly-finished and exquisitely-wrought piece of machinery, it may reflect great credit upon the executive skill of the mechanist, but it exposes to criticism and even ridicule the constructive genius, and it may be folly, of the designer. Collaterally its mechanical worth may be great, exhibiting the high perfection to which machinery may be brought; and if meeting the designs of the architect, its value may be increased beyond computation, as in the case of the Federal iron gunboat *Monitor.* The high value of this wonderful engine of war consists in its accomplishing certain intended purposes, and this at a time when most needed. Ten years hence, this now invaluable floating battery may be of comparatively little, if of any, importance, because others of greater power and perfection having taken its place. In reference to mechanical as well as all other products, their distinguishing characteristics of worth are found to consist in the time of their appearance, their nature and character, but chiefly in their results.

It is but an easy transition to make these reflections applicable to the products of dental toil. Dental operations, then, should always command and receive a remunerative fee corresponding to the intrinsic and adaptive value of the services rendered. Their real value doubtless consists in the combined expenditure of thought, muscle, time, and material; relatively considered, in the accomplishment of certain ends, in final results. These ends are the preservation of the natural teeth, and their proper substitution when lost. If all the demands are properly met in these two particulars, dollars and cents cannot suitably reward for such services. Nevertheless these tangible equivalents seem to be essentially necessary to meet the demands of humanity, and constitutes that for which all are struggling, and at times is the occasion for the manifestation of superhuman efforts; yet a just appreciation or a genuine gratitude is a far richer reward, and always enhances the value of the substantial consideration. A dental practitioner will most generally receive, from an appreciative public, a remuneration commensurate with the estimate which he conscientiously places upon his own operations. "For as he thinketh, in his heart so is he," and so is he estimated, as a general thing, by the world. Demands graduated by this criterion, community will most usually accede to, provided honesty characterizes the transaction. But here, as in other departments of human industry, this rule is subject to great abuse.

The designing, understanding well the potency of a claim based upon such considerations, employ it to their present, at least, pecuniary advantage; becoming quite eloquent at times in extolling the superiority of all their dental products, (especially the one under consideration,) even at the expense of the feelings, and reputation, it may be, of a very worthy co-laborer. But abuses do not destroy this lever of influence; neither indeed should they; for who is a better judge than the dentist himself of the value of his own operations? And when coupled with concessions of superior dental ability, on the part of the recipient, from actually having tested their worth, it becomes an influential force of double potency. Patients, in almost every instance, after a brief time, are rendered conscious of the true value of dental work, and these decisions must, sooner or later, inevitably determine the standing of such professional gentlemen, and settle, to a great extent, the amount which they can command for their services. *Vox populi, vox Dei,* is an expression which bears with singular significancy upon the standing and merit of all producers, as well as graduates the price of the thing produced.

Cheap dentistry awakens in the mind of the recipient the idea of inferiority, as certainly as exorbitant prices arouse the suspicion, if they do not force the charge, of extortion. Most dentists ask about what their operations are worth. There appears, then, to be great fitness in the prevalency of a diversity of dental fees in any community. There is no good reason why one gentleman, who operates rapidly and does his work very imperfectly at the best, should receive compensation in amount equal to one who spends as much again time, consumes much more material, and elaborates and finishes to great perfection in every particular. This diversity of dental prices appears to be founded in some justice after all; and it is generally understood by the public that a dentist, who fills a tooth with gold for a price ranging from seventy-five cents to three dollars, does not, and, indeed, many times cannot, without pecuniary loss, perform the operation as perfectly as one who charges from two to twenty-five dollars; neither can he produce, in all respects, as perfect and valuable a set of artificial teeth for fifty dollars as he can manufacture for one hundred and fifty dollars. What is it that saves a tooth or protects it from decomposition, so far as filling is concerned, if it is not perfection in all the minutiæ of the operation? If one professional gentleman is more thorough than another, more scrupulously particular in every step of the manipulation, making every part as near perfection as possible, he, most certainly, is entitled to a larger fee.

Competition, whether honorable or dishonorable, undoubtedly has an equalizing influence upon dental prices. The former is proper and right; and that dentist is wise who acknowledges, at least, the righteousness of the usage, although he may ignore its moulding force in his own practice. The latter, or dishonorable competition, is clearly reprehensible, and should receive in every instance the broad seal of condemnation. Happy, indeed, is he, who has not felt the poisonous fang of this loathsome and slimy monster.

The elevation of dentistry to the dignity of an honorable profession, or to a position claiming the prerogatives of a science, depends very much upon the integrity and high-toned feelings of its representatives, as well as upon meeting promptly and intelligently all its demands, in the endless complications and tedious routine of its therapeutic, artistic, and operative practice. And to enable and encourage the development of such qualities and capabilities as will give efficiency in either of these departments of dental exertion, its votaries should ever harmonize in every manly endeavor to perfect, in all essential qualities, the character of the service and elevate the standard of the remuneration; they should always protect the reputation of a true professional brother by expressing sentiments of esteem and respect, and regulate their professional intercourse with *all*, by those high and honorable considerations which seldom fail of commanding respect and confidence, and of eliciting a generous response on the part of the community, in fully appreciating and rewarding honest toil, superior skill, and self-sacrificing devotion.

PHILADELPHIA, March 15th, 1862.

PERIODONTITIS.

BY G. W. ELLIS, M.D.

PERIODONTITIS, literally rendered, signifies "inflammation around the tooth." The disease to which this term is applied, owing to the frequency of its occurrence, the great amount of pain attending it, and the readiness with which it generally yields to proper treatment, is one of the most interesting pathological conditions of the dental organ. But a few years since, when the practice of dentistry was confined almost exclusively to rude and uneducated operators, the treatment and preservation of painful or diseased teeth was a matter never contemplated, and extraction constituting the only reliable means of affording permanent relief, valuable teeth were at once sacrificed without any regard to either their beauty or utility; but thanks to those scientific men through whose untiring efforts dentistry has been led, by rapid advances, to an exalted and enviable position among the sciences, we are now enabled to treat successfully almost every abnormal condition of the teeth and their appendages. Periodontitis may be produced by a variety of causes mostly found among those contained in the following list: 1. The extension of inflammatory action from the pulp through the apicial foramen. 2. Tendency or determination of blood caused by extirpation of the pulp. 3. Caries so located as to impinge upon the cementum, the sharp, uneven edges of the cavity acting as an irritant, or by its walls lodging and holding in contact with the membrane decomposed and irritating substances. 4. Protrusion of fillings upon contiguous parts. 5. Salivary calculi deposited in contact with the periodonteum. 6. Mechanical injury. 7. Imperfect occlusion. 8. Loose fangs. 9. Irritating local applications, such as arsenic, etc. 10. Medicines whose effects are manifested in the teeth and jaws, such as mercury, phosphorus, etc. Inflammation of the dental periosteum is produced by the same general causes, and pursues the same course as inflammation in other tissues, occasioning, however, a class of symptoms somewhat different, owing to the anatomical peculiarities of the parts involved. It has been divided into two classes, the dental and alveolar, according as the membrane covering the root or lining the socket may be affected; this, however, is regarded as rather a useless distinction, for it is doubtful, owing to the close contiguity of these membranes—one, in fact, being but a reflection of the other—whether either one is often diseased without somewhat implicating its neighbor. But it is a matter of indifference which view may be entertained, since its adoption will not have the effect of producing any modification in the treatment.

Periosteal inflammation may be either *acute* or *chronic*. Under the former head are classed those cases in which the inflammation is well marked, the pain severe, and which, without treatment, would terminate in the formation of pus; under the latter head are placed those cases where the inflammation is of the sluggish or asthenic character, occasioning little or no pain, and often running on entirely unnoticed by the patient, producing thickening of the membrane and final loss of the tooth. The type of the inflammation is influenced both by the temperament of the patient and the character of the exciting cause, the acute variety occurring mostly in persons of full or sanguine temperament, and where the exciting cause has been violent and of limited duration; the chronic form being more prevalent in individuals of the lymphatic or bilious temperaments, and where the cause of trouble has been less violent and longer continued. The larger proportion of cases which we are called upon to treat being acute in their character, this form of the disease merits the first and more careful consideration. Commencing our observations with an examination of its symptoms, we notice that the first indication of an attack of acute periodontitis is manifested in feelings of slight uneasiness or tension, accompanied by a desire to work or press upon the affected tooth, for gentle and steady pressure will be found to give relief so long as it is continued; but on its withdrawal, the morbid sensations again return with equal if not increased vigor. But suddenly striking or tapping upon a tooth in this condition will cause great pain, and constitutes one of our most reliable means of diagnosis. Owing to the relief experienced from the application of pressure, we will always observe the patient closing the jaws firmly together so as to bring the painful tooth in contact with the antagonizing one, if such there be; but in consequence of the inability to keep them permanently in this position, the diseased organ is subjected to an alternate application and removal of pressure, serving only to hasten and increase the trouble, clearly indicating, as the first step in the treatment, the protection of the tooth by the introduction of some suitable apparatus to prevent occlusion. In a short time the uneasiness will culminate in a dull, heavy pain; the gum will become marked red, and considerably swollen, particularly in the depression near the root; the tooth will feel as if lengthened, and the parts become so tender that there is no longer any desire to move it, and the slightest tap upon it will produce so much pain that even closure of the jaws becomes impossible.

If no efforts are made to arrest the progress of the disease, that portion of the periodonteum affected will lose its vitality, become detached from the surface of the cementum, and secrete pus, constituting an affection known as *alveolar abscess.* In cases, however, where the whole of the membrane is implicated and finally destroyed, the tooth, cut off from all connections with the economy, becomes what is termed necrosed or dead. and, being a foreign body, produces the usual effects of such causes upon the surrounding tissues.

The treatment of periodontitis may be either prophylactic or curative, the former being based upon three local and three general considerations, viz.: 1. The removal of all irritating causes, either mechanical or vital, 2. Absolute rest of the part. 3. Applications of a tonic, astringent, sedative, or stimulant nature, as required. The constitutional treatment consists: 1. In the regulation of diet. 2. Bodily rest and quiet. 3. The administration of an aperient. In cases, however, where the acute inflammatory action has become fully established, the usual means for combating it elsewhere must be brought into requisition. Local blood-letting is indicated, not directly over but on either side of the inflamed part, care being taken to neither hasten nor retard the hæmorrhage. The use of the pediluvium as a derivant is advantageous, and the administration of a cathartic with the same view is also of great importance, mercury in some form proving very efficient, a cachectic or scrofulous diathesis, however, always contraindicating its exhibition.

In acute periodontitis great benefit is derived from holding in *constant* contact with the part a mouth-wash containing some antiphlogistic remedy, such as chlorate of potassa or acetate of lead, the former being strongly recommended in cases of high inflammatory action.

In the treatment of these cases, it is important to bear in mind the beneficial effects which result from maintaining the head in an elevated position, thus causing the blood to gravitate from rather than to the part, where we already have a superabundance. The observance of this fact will often render efforts successful which might otherwise have proven abortive.

The foregoing summary contains the most reliable and generally adopted treatment of periodontitis. It frequently becomes necessary, however, to combine with it the administration of constitutional remedies, such as arterial sedatives, diaphoretics, etc., which will be found to prove highly efficacious in subduing local inflammation. In this connection, it may be proper to make a few remarks in relation to the treatment of acute periodontitis in teeth where the nerve has been removed, and call attention to a remedy, the use of which, in such cases, suggested itself to me about a year ago, and which has been used ever since, both by Dr. Flagg (to whom I at that time mentioned it) and by myself, with the greatest success—I allude to nitrate of potassa, or nitre, as it is commonly termed.

In my first use of the material I employed a saturated aqueous solution, applied upon a roll of cotton, carefully introduced well up into the root. By this plan I obtained very satisfactory results, not so much so, however, as by pursuing the method afterward suggested by Dr. Flagg, of using it in the form of a powder, thoroughly packed in the fang canal by means of fang pluggers, thus securing the full antiphlogistic effects of the undiluted article. The fang and pulp cavity should be entirely filled with the material, the remaining cavity being stopped with some substance impervious to the saliva, which will require but little force either in its introduction or removal. On removing the outside stopping, in the course of a day or two the nitre will be found to have entirely disappeared, so that nothing will be necessary, save merely to refill and stop as before. The application should be renewed as often as the judgment of the operator may dictate, care being taken, however, in its introduction, to avoid prying or irritating the diseased tooth. Used in this manner, I think it will prove itself a valuable and reliable remedy.

In chronic inflammation of the dental periosteum the treatment, as in the acute variety, is both prophylactic and curative, the former consisting in the removal of any exciting cause and the employment of stimulant applications; the latter treatment must be conducted slowly, without endeavoring to produce any sudden effects, and consists in the stimulation and toning of the parts, and the application of a sorbefacient, such as iodine, to reduce any existing induration. Sometimes, however, this form of the disease is so far advanced before we are enabled to see the case, that extraction presents the only means of relief.

Philadelphia, April 15, 1862.

ARSENIC.

BY C. B. FOSTER, M.D.

In the Dental Cosmos, February number, 1862, Dr. H. M. White, in an article on Arsenic, refers to a "published thesis in the *Dental News Letter*, vol. vi. No. 4, July, 1853, by Dr. J. D. White, On the Treatment of the Dental Pulp, which includes the use of Arsenic," and says, "that was probably the first time that the recipe of arsenical paste was made public."

Under the impression that public attention had been called to it *prior* to the above-mentioned period, I have referred to some journals of an *earlier* date, and find in the *American Journal and Library of Dental Science*, vol. ii. No. 3, March, 1842, page 247, an article on "*The Use of Arsenious Acid for Destroying the Nerve in Decayed Teeth*, by W. E. Ide, M.D., of Zanesville, Ohio."

Dr. Ide refers to the employment of arsenious acid in combination with sulphate of morphia and creosote, and gives special and judicious suggestions for its use.

He says that in "'The Guide to Sound Teeth,' published by Dr. Spooner, of New York, in 1836, public attention is first called to its use." It thus appears that arsenious acid has been employed in dental surgery for more than twenty-five years. During this period it has been growing more and more into favor, and is at the present time more employed than any other agent for the same purpose; I regard it in my own practice as *indispensable*. Experience in its use enables me to determine so well the quantity to apply, and the length of time it should be retained in order to secure the object in view, that I am unwilling to subject my patients to pain in excavating sensitive dentine, knowing that it may be avoided by the application of the acid for a few hours. Those who have been disappointed in its use have most probably employed it in too large quantities, or permitted it to remain too long a time in the teeth.

I have known instances in which dentists have applied the arsenious acid liberally, then directed their patients to retain it until their next visit, a week or more afterward. Time is thus afforded for its absorption to an extent that will endanger the vitality of the teeth, and produce the injurious consequences for which some have *unjustly* condemned it.

If the creosote could be dispensed with, it would be desirable, on account of the unpleasant odor it diffuses throughout the room where it is used. I, however, have never found a substitute for it; it allays the pain, while the arsenic is acting upon the tooth, more effectually than any other article which I have ever tried. In regard to the *pain* resulting from this and other applications, it may be well to observe, that it is frequently produced by the mechanical pressure of the substances applied, the chemical action of the ingredients causing little or no irritation in many cases where there is much suffering.

PHILADELPHIA, March, 1862.

ARSENIC.

BY H. MEREDITH WHITE, M.D.

IN the present number of the DENTAL COSMOS there is an article, part of which takes exception to a clause occurring in a little scrap on arsenic, noticing a thesis written by Dr. J. D. White.

The part referred to is as follows: "And is probably the first time that the recipe of arsenical paste was made public." From these words the writer of the article referred to thinks it was intended to convey the idea that attention had not been called to the use of *arsenic* prior to the publication of said thesis, and goes on to refer to different journals of *earlier* date, in one of which he finds an article on the use of arsenious acid, by Dr. Ide, of Ohio, who refers to "The Guide to Sound Teeth," published by Dr. Spooner, of New York, in 1836. "It thus appears," says the writer, "that arsenious acid had been employed in dental surgery for more than twenty years."

Dr. J. D. White never claimed to have been the first to use *arsenious acid* in dentistry, nor the combination of arsenious acid, creosote, and acetate of morphia. All that he claims is that he was the first to combine the ingredients of his formula in the proportions published and *grinding* them together forming a *paste*, which had never been done previous to the preparation of his thesis.

Dr. J. D. White in his thesis speaks of some who used arsenic in dentistry, viz.: near the bottom of page 16 of the thesis, "J. J. Greenwood, of New York, employs it thus: 'Steep a lock of cotton in essence of peppermint, laudanum, or alcohol, then dip a point of the lock in powdered arsenious acid, and apply it in close contact with the pulp.' Dr. Ide, of Ohio, in a communication to the *American Journal of Dental Science*, gives the following formula, which he has used with great success:—

℞.—Arsenious acid, gr. iij;
Acetate morphia, gr. ij.
Misce.
Applied to the pulp on a lock of cotton.

Dr. Spooner, of New York, in a work entitled 'Guide to Sound Teeth,' speaks of the use of arsenious acid in the highest terms. Dr. S. Brown, of New York, in the *American Journal of Dental Science*, says, 'The arsenic should be applied on the extremity of a lock of cotton steeped in creosote instead of water. The effect of the creosote is to allay the pain which arsenic alone would produce when acting on the living tissue.'"

Another extract, page 21, note: "This thesis formed the basis of several articles already published, but it was never intended to see the light; still there is not a principle or mode of practice advanced in it that subsequent reflection or experience has given any reason to suggest a change. The mutations through which the treatment of the dental pulp has passed during the last twenty or thirty years by many observers, and the apparent unsettled condition of the subject now, would not give any single one a very large share of credit for modification or improvements up to the present time. Dr. J. R. Spooner, of Montreal, was the first, doubtless, to use arsenious acid as a substance to destroy the vitality of the dental pulp, but it has been rendered much more efficacious by its proper combination with other substances suggested by other experimenters."

At a meeting of the Association of Dental Surgeons, during a discussion on Arsenic, a member, in an elaborate manner, proved that Dr. J. D. White was not the first to use arsenious acid in dentistry. In the published proceedings, however, this does not appear. It was a useless task, as the above quotations will show.

Another, at the same meeting, "spoke of the deficiency which existed as to well-substantiated theories of its manner of accomplishing its purpose," "and differing decidedly from the opinion which had been advanced in the same number of that journal as to the propriety of considering the thesis of Dr. J. D. White as satisfactorily answering the demand for information in this direction."

To this it is sufficient to say, there is *no such opinion* advanced in the article referred to, as can readily be seen by reading it *slowly*.

PHILADELPHIA, April, 1862.

LITTLE THINGS.

BY J. S. LATIMER, D.D.S.

SMALL, STRAIGHT PLIERS, such as are used by jewelers for handling the fine works of watches, are excellent for carrying pellets of gold to the cavity. They cost from twenty to twenty-five cents. When purchased, they are devoid of temper, but they can be given a spring temper in a few minutes.

Tempering is usually attended with some uncertainty, and the profession is, and ought to be, grateful to Professor Buckingham for his excellent hints on this subject, in the January number of the DENTAL COSMOS. I find, by trial, that water from the hydrant standing at 52° F. was reduced to —14° F. by mixing with ice and salt; thus reducing the temperature 66°. This temperature of the cooling medium enables me to obtain a very hard temper without heating the steel higher than to a dull red. Of course snow is equally as good as pounded ice.

EMESIS is a most decided foe of the dentist. Many patients cannot bear a napkin, even of the smallest size, in the mouth without nausea. I have known gentlemen to work two days at such a patient, in the endeavor to obtain an impression of the mouth; and even after the plate was made, its presence in the mouth, during many months, provoked this most unpleasant sensation.

I know of no way of preventing emesis, but I have succeeded, by letting the patient omit one meal before the attempt, and then, with plaster in the impression-cup, the head thrown well forward and firmly held in position until the plaster is set, which, if it has been made rather thin, and well stirred before putting into the cup, requires from one to two minutes.

SENSITIVE DENTINE is one of the most troublesome hinderances to patient and operator. Many are the theories concerning it. Many the teeth that are lost because the patient cannot summon sufficient courage to endure the pain of excavation. Many the plug that is lost, and many the curse uttered against the inserters thereof, because of sensitive dentine.

Some treat it with arsenic; some, with chloride of zinc; and others simply with creosote; while many insert temporary fillings of osteoplasty, Hill's stopping, or wax, and defer the operation a few days. But, best of all these "little things," is the notion of Dr. B. W. Franklin, communicated to the New York City Dental Association, at its last meeting, February seventh. Dr. F. said he had early adopted the acid theory of caries, and for some years had imputed abnormal sensibility of the dentine to the same cause. *How* the sense of pain was conveyed to the sensorium, he did not explain; but his experience had taught him that alkalies were the antidote to sensitive dentine.

Dr. John Allen corroborated the theory of Dr. Franklin, and added that he frequently had tooth-edge of his inferior incisors, which were considerably worn, from eating acid fruits, and that he removed the sensibility by rubbing an alkaline solution on them.

Dr. Ambler, of Brooklyn, stated the case of a patient of his, who, during gestation, came to him to have several teeth filled. The fluids of the mouth were strongly acid, as is generally the case with females in that condition, and, as a consequence, the teeth were being rapidly broken down. The decays were mostly on approximal surfaces, and the dentine was so sensitive that excavation was impracticable.

Happening to mention the case to Dr. Franklin, he was induced to try the alkaline treatment. He prescribed a lotion of carbonate of soda, about a drachm of which to be held in the mouth for a minute or two every half hour during the day and evening, while five to ten grains of carbonate of soda in solution were taken internally every four or five hours, the former to neutralize acid in the oral cavity, while the latter corrected the acidity of the stomach.

This treatment was continued for one week, when he excavated and filled the teeth without the least pain.

Will not others try this expedient and report results?

New York, February, 1862.

FOIL CRIMPER FOR ADHESIVE GOLD—NEW INSTRUMENT.

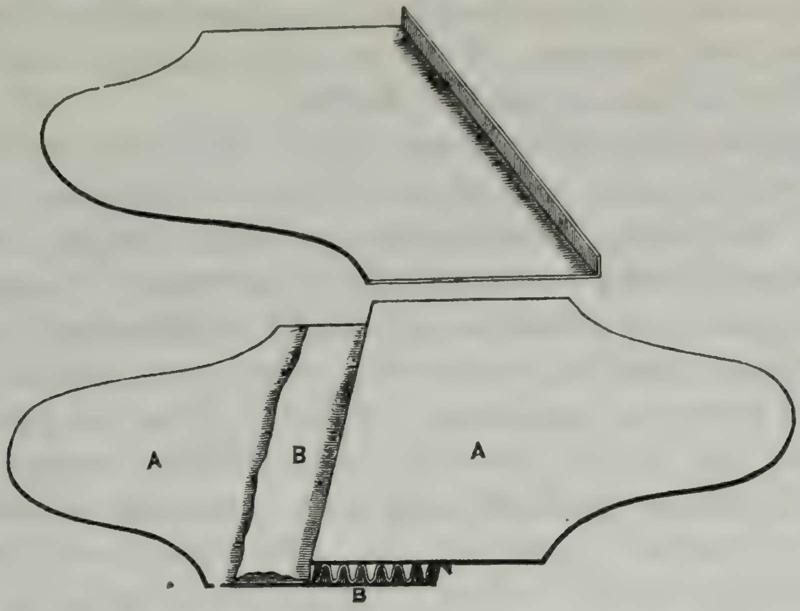
BY J. A. M'CLELLAND.

The perfection, durability, and beauty of fillings which may be made with adhesive gold foil, must finally insure its adoption by all operators who would aim at the highest attainments of the dental art. The successful use of this material depends so much upon the manipulation its peculiar properties require, that any suggestions or improvements which will facilitate its use cannot fail to be favorably received.

The best and most expeditious method for preparing the foil for use becomes of the first importance. The method usually practiced of twisting the foil into rope with the fingers is tedious, and to prepare a delicate strip in this way, with any uniformity, requires too much time. The handling is also an objection, notwithstanding that any moisture from the hand may be driven off in the process of annealing, a debris remains, which will affect in some degree the perfect welding of the gold.

Having devised a very simple and eminently *practical* instrument for preparing adhesive gold foil, which entirely overcomes all the little difficulties and objections of the old method, I propose to give a description of it, that the readers of the Dental Cosmos may enjoy its advantages; for, once tried, I think it will not be dispensed with. With it the foil can be prepared *expeditiously* and perfectly, of any desired size, without so much as touching the gold with the fingers.

The instrument I have in use is made of tin, though I think the best material would be vulcanized rubber, on account of its lightness and the delicacy with which the instrument could be made. Take two pieces of sheet tin the width of a sheet of gold foil, and about the same length, (they may be made something like a paddle in shape;) turn a flange on the broad end of the "paddle" at right angle with the plane, and about one-sixteenth of an inch deep. The two parts of the instrument are to be made just alike, and must be without warp or spring, the flange being a perfect straght-edge. A A represents the instrument; B, the crimped foil.



The foil may be cut in strips of any desired size, and laid upon one plate with the flange up; place the other plate over the foil with the flange down, embracing the foil; draw one plate along upon the other, *crimping the foil between the two flanges*, when it may be rolled between the paddles, or, if preferred, used in the flattened state. The latter will be found most convenient in many cases.

By this method of preparing adhesive gold, there is not only a saving of time and dispensing with handling, but the gold works better than pellets made from the *twist* rope. The plugger sometimes passes through the twist without taking the gold, which is not so apt to be the case with the crimped foil.

Louisville, Kentucky, March, 1862.

THE PROFESSION IN ENGLAND.

(FROM OUR LONDON CORRESPONDENT.)

With feelings of the greatest regret I have to convey to you the mournful tidings of the death of Mr. James Robinson, which sad event took place early in the morning of Tuesday, the 4th instant, at his private residence, Kenton, Harrow, Middlesex.

Mr. Robinson's name was probably more extensively known in the world than any other practitioner as an energetic and valuable member of our profession. His contributions to the literature of dental science were early appreciated in America, from which country he received the honorary degree of Doctor of Dental Surgery. He was also known as the introducer of anæsthetic agents in England; but, above all, his name will be ever remembered as the first President of the College of Dentists of England. He was, at the period of his death, a Vice-President of that institution, its Treasurer, and an able member of the Court of Examiners. It is mainly owing to his extraordinary exertions that the National Dental Hospital is in existence. Truly we have lost a good man at a period when, alas! good men are not too plentiful.

His departure from the world was sudden. On the Saturday before his death he was the active head of one of the most extensive practices in England. On Sunday, March second, at about half-past five P.M., he was in the act of using a pruning-knife to the branch of a shrub; the instrument slipped, and inflicted an apparently trifling wound in the thigh. At first thought lightly of, the accident turned out to be a serious one—the femoral artery was penetrated. Whether or not his life could have been spared had prompt assistance been available, I cannot say; as it was, poor Robinson gradually sank from exhaustion on the following Tuesday, at 12.45 A.M., aged forty-nine. His funeral took place on Tuesday, the eleventh instant. About thirty dentists, including the Council of the College of Dentists, and the dental officers of the National Dental Hospital, followed the lamented deceased to the grave, besides a large number of medical practitioners, and other friends. He was buried at Highgate Cemetery.

Mr. Robinson was firmly persuaded that an organization of the dental profession, to be effectual, and to confer proper status on its members, must be founded on an *independent* basis. His friends are united to carry out his matured views.

LONDON, March 13, 1862.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.*

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of April 8th, 1862, at eight o'clock.

President, Dr. T. L. Buckingham, in the Chair. Present, Drs. Peirce, Fitch, McQuillen, Hayhurst, Garretson, Kingsbury, S. S. White, Flagg, H. M. White, D. Roberts, Townsend, Gardiner of Mexico, Edward Parrish, Hastings, and Barker.

The subject for discussion was stated by the President to be

"THE USES OF ARSENIOUS ACID IN DENTISTRY,"

continued from last meeting.

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* The following was omitted from the Association Report for March, 1862:—

Dr. Barker stated, on presenting his paper on "The Dentition of the Elephant," that he had quoted, at considerable length, from the works of Owen, Cuvier, Rousseau, Roget, and other standard authors, as it was out of his power to make any personal investigations on that subject.

Dr. Geo. T. Barker then read the following paper:—

The Action of Arsenious Acid on Animal Tissue.

The importance of a correct knowledge (to dentists in particular) of the action and influence of arsenious acid on living animal tissue cannot for a moment be questioned, and yet, on a careful examination of standard works, no question seems to be more a matter of doubt and speculation. Some of the most careful observers contend that arsenious acid forms a definite compound with one of the elements of animal tissue; while others, equally eminent, contend that its action is that of an irritant caustic, the subsequent death of the tissue being due to inflammation, induced by the presence of a foreign agent, having the power to modify the life forces. Considering that the presentation of these conflicting opinions may be of use in the formation of a correct judgment, your attention is called to the following quotations. Dr. George B. Wood, in his Treatise on Therapeutics and Pharmacy, in speaking of arsenic, says:—

"The preparations of arsenic are locally very powerful irritants, and even caustics; upon the system their effects are powerfully irritant, but at the same time quite peculiar, and in the end depressing. Their first effect when topically applied is intense inflammation, which, if the quantity used has been sufficient, quickly ends in the death of the part. It is not, therefore, by a chemical or corrosive influence that arsenic operates, but dynamically upon the vital properties. The part perishes because it is stimulated beyond its powers of life. When the medicine is swallowed, the first irritant or inflammatory effects on the primæ viæ would seem to be the result of a local operation, and, to a certain extent, they must be so; but when it is considered that a similar condition of the mucous membrane is induced by its external use, the conclusion seems to be inevitable that even in the former case, the local effect on the stomach and bowels must be in part ascribed to an influence upon the tissue exerted through the system after absorption has taken place. That arsenic is absorbed has been placed beyond doubt by its detection in various parts of the body and in the secretions after its internal exhibition. Not only has it yielded evidence of its presence to chemical tests, but the metal itself has been recovered; and these results have been obtained not in a few instances only, and in experiments on the lower animals, but very frequently, and in the human subject."

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"How arsenic operates after absorption has not been shown; and it is useless to speculate on the subject. Its effects on the pulse, skin, urinary organs, etc. prove that it is an irritant as well when in the blood as elsewhere; but the symptoms of depression, faintness, and great prostration, which it also often very speedily induces, would seem to indicate that it has a directly prostrating power on some of the great vital organs, or at least that its irritant effects are so prompt and powerful as to overwhelm them. That it has no special tendency to act on the lobes of the brain, is shown by the clearness of intellect which not unfrequently remains almost to the last moment in cases of poisoning. There is no proof that it operates by producing any change, either chemically or vitally, in the blood; for though this has sometimes been found fluid and black, the same result often happens when the respiratory process is fatally interfered with; and does not uniformly happen in cases of arsenical poisoning, the blood being sometimes to all appearances perfectly healthy."

Dr. Alfred Stillé, in his late work on General Therapeutics and Materia Medica, in referring to the action of arsenious acid, says:—

"According to Miahe, it is probable that metallic arsenic and also its sulphurets (realgar and orpiment) are not in themselves poisonous. But the arsenical sulphurets of commerce contain a large proportion of arsenious acid. When either of these preparations, or metallic arsenic itself, is taken into the stomach, it may furnish to the alkaline chlorides contained in the gastric secretions the material for forming arsenious acid in sufficient quantity to operate as a poison."

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"The caustic operation of arsenic demonstrates how readily it enters into combination with the constituents of the body. Its detection in so many of the organs and secretions, and the symptoms which it occasions in the former, render evident its wide diffusion through the economy. The fact that however introduced its effects are essentially the same, and that it frequently, when swallowed, is fatal without producing any gastric lesion whatever, proves also that its action is not merely local. Further, this presumption is sustained by all the phenomena of chronic arsenical poisoning. The gastro-intestinal symptoms usually produced by arsenic in the human subject, and in animals poisoned by it, even when it is applied to the skin, show that it seeks an outlet from the system by the bowels; while the fatal cases just alluded to, in which no gastric lesion is produced, prove on the other hand that its chief morbific (and curative) operation is on the system at large. These facts and conclusions point to the blood as the probable seat of the changes upon which its sensible effects depend. What these changes are, has not been revealed by any direct observation. The fluidity of the blood observed in some cases of arsenical poisoning is not present in all, but the production of serous effusions as an ordinary effect, and of chronic anæmia as the consequence of prolonged exposure to arsenical influences, appear to furnish grounds for believing that, in sufficient doses, arsenic, like mercury, tends to disintegrate the blood corpuscles, to diminish the proportion of fibrin, and also to attack still more directly the vital principle upon which the normal qualities of the blood depend. This theory is not inconsistent with the results obtained by the administration of arsenic in minute doses, and which have led to a tonic virtue being attributed to it. In such doses it unquestionably stimulates the stomach, either by its direct action or by its secondary operation, and probably at the same time promotes the secretion of the liver, pancreas, and mucous glands. If so, it does what all condiments are intended to effect, facilitate digestion, and by that means improve nutrition. Indeed, arsenic has with the irritant condiments (pepper, mustard, ginger, etc.) this common quality, that when the habit of using is suspended, digestion languishes, and the health declines."

From a London monthly journal, entitled *Annals of Pharmacy and Practical Chemistry,* I would present to notice the principal points of a discussion which extends through several numbers, but which, from the difference of opinion arrived at, the result of experiments by the eminent gentlemen engaged, is worthy of careful study and perusal.* Dr. Sheridan Muspratt, a pupil of Liebig, Professor of the College of Chemistry at Liverpool, after speaking in the severest and most deprecating terms of John B. Edwards, (teacher of Practical Pharmacy in the Liverpool Chemists' Association,) for having written the following: "If water so readily extracts arsenious acid, both from the compounds formed in the laboratory and from those which nature has prepared, surely we may conclude that its retention is simply mechanical, and affords no ground for the theory which the eminent chemist Liebig has reared upon it," says—"In speaking recently with Liebig upon the above remarks, he replied almost as follows: There will always be men ready to carp at the sayings and doings of their superiors; but if I were to take up my valuable time in answering them I should not have any time left to devote to other and more useful purposes. I know, and you do, from experiment, that *albumen does form insoluble compounds with arsenious acid and mercury;* consequently any repetition on my part would be superfluous."

In corroboration of the above, Dr. Muspratt quotes a number of authorities—Baron Liebig's chemistry of Physiology. (Extracts.) "Arsenious acid and mercury are the true inorganic poisons, the action of which depends upon their power of forming *permanent compounds* with the substances of membranes and muscular fibres." "When solutions of these salts are treated with a sufficient quantity of albumen, milk, muscular fibre, and animal membrane, they enter into *combination* with those substances and lose their solubility." And again: "The action of arsenious acid and corrosive sublimate is very remarkable in this respect—that is, they produce morbid phenomena by entering into combination with the organized parts of the body, therefore disturbing the functions of these parts and acting as poisons." Further: "Arsenious acid *enters into a very firm combination* with membranes and gelatinous tissues." "The arsenious acid, combining with these tissues, gives them the power of resisting decay or putrefaction." "It is further known that the parts of a body which come in contact with these substances during poisoning, and which therefore *enter into combination with them*, do not afterward putrefy, so there can be no doubt regarding the cause of their poisonous qualities." "If a vein be exposed and surrounded with a solution of arsenious acid, every blood globule will *combine with it*." And again: "The compounds of arsenic which have not the property of entering into combination with the tissues of the organism, are without influence on life even in large doses. Many insoluble basic salts of arsenious acid are known not to be poisonous." "The substance called alkargeen, discovered by Bunsen, has not the slightest injurious action upon the organism; yet it contains a very large quantity of arsenic, and approaches very closely in composition to organic compounds." "All substances administered as antidotes in cases of poisoning, act by destroying the power which arsenious acid and corrosive sublimate possess of *entering into combination* with animal matters, and of thus acting as poisons. Unfortunately no other body surpasses them in that power, and the compounds which they form can only be broken up by affinities so energetic that their action is as injurious as that of the above-named poisons themselves." "When the action of arsenious acid or corrosive sublimate is confined to the surface of an organ, those parts only are destroyed which enter into combination with it; an eschar is formed which is gradually thrown off."

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* The following synopsis is taken from the American Journal of Medical Science, vol. xxiii.

Such, says Dr. Muspratt, are the few extracts from the great physiologist's work on this subject.

Mr. Mercer, citing his results, says he "took 100 grains of albumen and one grain of arsenious acid and coagulated by heat. He boiled the coagulate in water and could only get a small stain by Marsh's test; on decomposing the organic matter, the proof was abundant. He therefore thinks that combination had taken place."

Mr. Dawson: "I took the white of a perfectly fresh egg and mixed it with a large quantity of dissolved arsenious acid, and triturated well for some time, then coagulated the mixture by heat. My product was a snow-white substance possessing an agreeable smell; when washed with cold water it gave no indications of arsenic. The residue on the filter was dried and its organic matter carefully destroyed by sulphuric acid; the black fluid, when submitted to Marsh's apparatus, gave *large, bright, black stains* of metallic arsenic—a proof of the compound mentioned by Liebig."

Professor Gregory: "He performed some experiments in Dublin in 1837, which satisfied him that Liebig was right."

Sir Robert Keene: "The compound of albumen with arsenious acid, and other acids, is somewhat *soluble;* with metallic oxides, insoluble."

Dr. Anderson: "There is, in my opinion, no doubt that the metallic poisons are capable of uniting with animal matters; and this, I apprehend, is perfectly well known to all toxicologists, and is the universally received explanation of their antiseptic properties."

Dr. Muspratt: "I took 0·107 grm. of arsenious acid, and 12·67 grms. of the glairy albumen of eggs. They were intimately triturated together for about twenty minutes, coagulated by heat, and evaporated to dryness in a water bath. The white residue affused with distilled water, yielded a filtrate which gave *no deposit* of arsenic on copper by Reinsch's test, nor any stains on porcelain by Marsh's apparatus. When the residue on the filter was heated with pure sulphuric acid, and then submitted to the preceding experiments, arsenical indications were immediately obtained, proving that a combination of arsenious acid and albumen had occurred. The albuminous compound is sparingly soluble in boiling water, so that, when affused a considerable time, *i.e.* by using quarts or gallons of hot water, the whole of the albumen and arsenious acid might be washed away."

Mr. W. Gaskill, of Manchester: "I took 26·807 grammes of albumen, triturated it in a mortar, then added 208 grammes of arsenious acid, previously dissolved in about four ounces of water; triturated, coagulated by heat, and evaporated to dryness. I next pulverized the brownish-yellow residue in a mortar, placed it on a filter, and edulcerated with forty times the bulk of water previously used to dissolve the arsenious acid. I could detect traces of albumen and arsenious acid in all my washings, but never *arsenious acid alone.* I tested the residue for arsenious acid, and detected a large quantity. Now, if no compound is formed, why was not the whole of the arsenious acid dissolved out by a quantity of water ten times more than is required to effect its solution?"

Mr. Adam J. Harrie: "30·097 grammes of albumen were triturated for some time. I then added 0·307 grammes of arsenious acid, previously dissolved in about three ounces of water; triturated them together for half an hour, coagulated by heat, and evaporated to dryness at 212° F. The brownish residue was then pounded and washed, with about forty times as much water as was used to dissolve the arsenious acid. I detected arsenious acid and albumen in all my washings. Arsenious acid was also detected in the residue by Marsh and Reinsch's test, which evidently shows that a very firm combination of arsenious acid and albumen was formed, frugally soluble in water."

Mr. R. W. Foster, of Whitehaven: "I weighed out 36·24 grammes of albumen of eggs, and triturated for some time in a mortar. I then dissolved ·415 grammes of arsenious acid in about five ounces of hot water, allowed the solution to cool, and added it to the albumen in the mortar. The mixture was next triturated for about twenty minutes, coagulated, and evaporated to dryness in a water-bath. The dry residue was then reduced to powder, thrown on a filter, and washed with boiling water until no arsenious acid could be detected in the filtrate. In the whole of the washings (which amounted to nearly a gallon and a half) albumen was detected; and in the first portions, arsenious acid also in considerable quantities. When the washing was completed, the residue on the filter was boiled with pure sulphuric acid, and submitted to Marsh's test; but no arsenical indications were obtained."

M. Dumas, in treating of the combinations of albumen and metallic oxides, remarks: "These combinations are difficult of decomposition, and the metallic oxide *can only be entirely separated* by destroying the animal matter. The mercury compound is soluble in several saline liquids; therefore, when white of eggs is given as the antidote to the poisonous effects of corrosive sublimate, chloride of sodium should be avoided, in order to prevent the solution of the compound in the secretions of the stomach."

Berzelius states: "Sulphate of albumen is always formed when albuminous solutions are precipitated; *it may be decomposed*, evidently showing that combination has taken place, and the acid abstracted by the carbonate of ammonia. Even after continued washing, sulphuric acid and albumen may be detected in the coagulum."

Thornton J. Herepath says: "499 grains of the glairy albumen of eggs were taken and intimately mixed, by long-continued trituration, with three grains of arsenious acid; the latter having been previously dissolved in a quantity of water sufficient to effect a perfect solution. The mixture was then coagulated by heat, and afterward carefully evaporated to dryness in a water-bath. The yellowish residue thus obtained *was reduced to a very fine powder in a mortar, and repeatedly digested for several hours together in boiling water*, care being taken to reduce the compound to a still *more minute state of division by patient trituration in a mortar after each digestion.* The washings, on being tested by Reinsch's process, were found to contain a large portion of arsenious acid. The insoluble residue having been digested in water for about *twelve* or *fifteen hours*, as before described, was dried and weighed. It amounted to about twenty-nine grains. It was then boiled with strong hydrochloric acid, when it dissolved with the characteristic color of the protein compounds. Upon testing this solution in the usual manner, only *exceedingly minute traces of arsenious acid could be detected.*"

All the above quotations are referred to by Dr. Muspratt with approbation, except the last. The mortar and pestle and hot-water operation only go to show (as he says) that the compound has not been a perfectly insoluble one. Sulphate of lime is insoluble, so is glass; yet if either be reduced to powder in a mortar, and treated repeatedly with boiling water, traces of dissolved particles will be found.

Mr. Herepath, in his answer in a succeeding number of the journal, states the following, bearing on the point at issue:—

While Liebig and his followers assert that arsenious acid and albumen combine in atomic proportions, and thus form a true chemical compound—an arsenite of albumen—his opponents contend that the action is merely mechanical; that the small quantity of arsenious acid which is abstracted from the solution by the albumen is enveloped, so to speak, by the latter substance, or condensed upon the surface of its molecules, just in the manner as the feculencies are abstracted from saccharine syrups in the well-known process of clarification; or as iodine and certain alkaloids are separated from their solutions in animal charcoal.

In reply to Dr. Muspratt's examples of sulphate of lime, glass, etc., on being reduced to powder and dissolved, giving out some of their constituents, Mr. Herepath says that glass, for instance, consists of several earthy and alkaline silicates, some soluble in water and others not; and the natural effects of long digestion in water are, that small quantities of the former are dissolved out. But *solution* is not *decomposition.* "Now that the arsenite of albumen, or albuminate of arsenious acid, (if such a compound does exist,) is decomposed by boiling water, I consider is clearly demonstrated by my experiments."

The presence of minute traces of arsenic in the residuary matter is to be explained from the almost impossibility of removing the last traces of a foreign body, even from a simple inorganic precipitate; and still more from an albuminous coagulum, where the contaminating ingredient is enveloped, so to speak, in an almost impenetrable covering.

Dr. Muspratt rejoins: "I have repeatedly stated that the action of the so-called arsenite of albumen on the animal economy is not poisonous, a statement to which I adhere. In conclusion, I have only to add that white of eggs contains *free alkali*, which combines with the arsenious acid; consequently if Mr. Herepath got a poisonous compound, it is the arsenite of soda, and not the arsenite of albumen."

Mr. Herepath's reply to the above is as follows: "The presence of free alkali in the albuminous portion of the egg is an established fact; but it still remains to be proved that an arsenite of soda is formed when arsenious acid is boiled with white of eggs. If such be the case, how is it possible to account for the absence of all traces of arsenic in the experiments detailed by Dr. Muspratt?"

"The most convincing argument against the existence of a definite compound of arsenious acid and albumen, is the non-formation of any precipitate upon mixing cold aqueous solutions of these substances. For it is well known that tannic acid—a much weaker acid than the arsenious acid—immediately produces a dense precipitate of tannate of albumen when added to albuminous solutions."

Thus ends the discussion—the principal points only having been introduced to your notice—and now, for a moment, I would beg you to reconsider with me the principal points advocated by Liebig, Dr. Muspratt, and his followers. *Firstly.* Arsenious acid forms with the albumen of animal tissue a permanent and *insoluble* compound termed the arsenite of albumen. *Secondly.* Arsenious acid enters into a firm combination with membranes, and gives them the power of resisting decay or putrefaction, and that parts of a body with which it comes in contact, and which enter into combination with it, do not afterward putrefy. *Thirdly.* That the arsenite of albumen is innocuous, and does not act as a poison to animal tissue.

In as brief a manner as possible, I propose to discuss these three points, and will detail the result of my own experiments. My object first was to discover if an *insoluble compound* was formed by the union of arsenious acid. Two hundred and fifty grains of the glairy albumen of eggs was thoroughly mixed, by means of long-continued trituration, with one and a half grains of arsenious acid previously dissolved in water. The mixture was then coagulated by heat and evaporated to dryness. The yellowish residue reduced to a fine powder in a mortar, affused with water, and filtered, yielded a filtrate. The filtrate first obtained, and each subsequent one, gave the most unmistakable evidences of the presence of arsenious acid. I should not, from my own limited experience in testing for arsenious acid, so unhesitatingly avow that such substance was present, (in the face of the fact that by substantially the same experiment Dr. Muspratt failed to discover the agent present in the filtrate,) were it not that in my experiments I was assisted with the valuable services of my friend, Professor T. L. Buckingham, who concurs with me in asserting that arsenious acid was present in all our washings. The following reagents for detecting arsenious acid were used : Ammoniacal Nitrate of Silver, Ammoniacal Sulphate of Copper, the white filtrate of the first being changed to a canary-color, in the latter to an apple-green, or, as termed, "Scheele's Green." Professor Reinsch's test, which is considered the most delicate, gave, as you see from the strips of copper, and the glass with arsenious acid condensed on its sides, which I present to your notice, the most unmistakable traces of large quantities of arsenious acid.

A short description of the test may not be inappropriate. It consists in acidulating the suspected liquid with hydrochloric acid, and boiling in it for ten minutes a slip of copper foil on which the arsenic is deposited as a white alloy, and then separating it in the state of arsenious acid by subjecting it to a low red heat, in the bottom of a small glass tube, (U. S. Dispensatory.) The Marsh test was also tried, the same result as with the others being obtained. It consists in taking advantage of the power which nascent hydrogen possesses of decomposing the acids of arsenic with the result of forming water and arseniuretted hydrogen. The suspected liquid is mixed with dilute sulphuric acid, and placed in one of Professor Hare's self-regulating generators of hydrogen. If the solution contain arsenic, the nascent hydrogen will combine with the metal, and the nature of the compound may be determined by burning a jet of it from a fine-jet pipe connected with the generator. The flame will have a characteristic blue color, and by holding a porcelain dish over it, a film of metallic arsenic will be deposited. It is necessary to be sure of the purity of the apparatus by a preliminary trial of the hydrogen before the suspected liquid is added, as zinc and sulphuric acid are both liable to contain minute particles of arsenic.

The experiment was repeated with the same results as stated above, so that though there may be such a compound formed as arsenite of albumen, it is not an *insoluble* compound, as stated in the first proposition. Albumen was also detected in the filtrate, and particularly was this observable when the test for arsenious acid, by Marsh's apparatus, was in progress, on pouring the filtrate into the jar in which hydrogen gas was being made; by the action of sulphuric acid on zinc, the sulphate of albumen, as stated by Berzelius, was formed so rapidly, and interfered so decidedly with the formation of the gas, that it was necessary to hasten so as to obtain the stains on the porcelain, the requisite proof of the presence of arsenious acid.

(To be continued.)

ALUMNI OF THE PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

BY E. E. HOPKINS, D.D.S.

THE annual meeting of the Alumni of the Pennsylvania College of Dental Surgery was held on commencement day, February 28th, 1862, at 3 P.M., in one of the rooms of the college.

The roll was called, when the minutes of the last meeting were read and approved, after which the following officers were elected to serve for the ensuing year.

President—Dr. D. H. Goodwillie.
Vice-President—Dr. C. L. Smith.
Secretary—Dr. E. E. Hopkins.
Treasurer—Dr. T. G. Lewis.

The following gentlemen were elected essayists for the next annual meeting of the Alumni: Drs. G. T. Barker, H. Libert, H. A. Coe, S. K. Palmer, and C. L. Smith.

Dr. Wm. H. Atkinson, of New York, was called upon to address the meeting, to which he responded by a few appropriate remarks. He was followed by Drs. G. T. Barker and H. A. Coe, who spoke at some length.

A large number of students became members of the Alumni.

The meeting then adjourned to meet on next commencement day.

EDITORIAL.

TREATMENT OF DECIDUOUS TEETH.

We receive so many letters from inquirers after knowledge on the different branches in the dental art, that it has long since ceased to be possible for us to answer each one individually; and hence we have for many years, in our writings, confined ourselves to such practical subjects which we thought would be of the greatest and most immediate good for all learners in our art. But still, no matter how close we apply ourselves in that direction, we cannot supply the rapid demand, or in other words, stop off individual inquirers. But we regard this as far more encouraging than discouraging.

We saw an able article recently on this subject in the *New York Journal.* We hope that writers—especially journal writers—will take a hint from this not to write long, labored, mystical, and altogether theoretical and lumbering articles for the journals. While publishers of periodicals do not wish to shut them out, they publish them with reluctance, and for want of better and more useful matter. It is certainly true that the mass of the profession is seeking practical knowledge, and that is what the publishers of all the periodicals we know of established them for. If there are numbers of members of the profession who wish to get their fine-spun theories before the profession, let them publish them in pamphlet form, or as treatises or text-books, at their own expense, and let buy them who may. We do not oppose science or the publication of scientific articles, but science is as simple as practice; but there are few writers with whose writings we are acquainted can see it so.

We make the foregoing remarks, more especially from the fact that the following questions have been put to us from a respectable source, on the treatment of children's teeth. The writer says:—

"I wish you to answer the inquiries I make. What is the best method of treatment of temporary molar teeth in children between three and seven years of age, which have decayed, and have gum-fistulæ formed? In adults I practice the remedies usually recommended by our best practitioners, and am more or less successful in bringing the parts to a healthy condition; but from a variety of circumstances—the age, the condition of the system, and the short period of time before the permanent teeth came—could the same remedies be used? If there is highly inflamed periosteum of the molar teeth in children, what is your treatment? Can extraction be avoided in this state of a case? Nitrate of silver and iodine are among the chief remedies for gum-fistulæ, but how serviceable are they or practicable when used on children? I shall be pleased to hear from you on these special branches of our profession."

With reference to these first inquiries we would say, that we treat deciduous teeth, from three to seven years old, in the same way that we do adult teeth. We made that a special charge in our valedictory address to the first graduating class of the old Dental College of Philadelphia, as the too early extraction of the deciduous teeth produced many injuries. When a molar pulp is exposed we destroy it as in an adult tooth; take it out; as far as we can, wait until the bleeding subsides, and plug the cavity; if it be a firm tooth, with gold; if not very firm, with Hill's stopping. We do not use the oxy-chloride of zinc in children, because we cannot well keep it dry long enough as in adults, nor can we remove it as readily as the Hill's stopping. If pain sets in from inflammation of the periosteum, we remove the plug, open the roots freely, and relief is generally sure to follow. If the case comes to us too late for that, we let suppuration take place, and then lance the part as in an adult, and let the case take its course. There need be no anxiety to heal up the fistulous opening in the gum, as that can do no harm, at least not as much as the extraction of the tooth, if it be a long time before the period for the eruption of the second teeth. Sometimes, where the teeth will not bear the plug without bringing on immediate inflammation, we let them decay away, as the roots only remaining keep space for the adult teeth, and also prevent contraction of the gum. Even the roots remaining help to invite blood to the parts, and assist the growth of that locality, which of course is necessary to proper development of all parts. There is a determination of blood to a part proportionately to the amount of tissue to be supplied, conversely, as a physiological principle; extraction should be avoided, even of root, unless where a "variety" of circumstances demand it—such as an extreme irritability of parts, which gives rise to constant pain,whether in a high state of inflammation or not, or very often repeated attacks of acute abscess, or injury to adjacent teeth, loss of sleep to the patient, signs of caries, sloughing, etc.

We never plug the roots of deciduous teeth, merely the large portion of the pulp cavity of the crown of the tooth. We never expect to heal an abscess of a deciduous tooth as of an adult tooth; that is all the difference between treatment. It is desirable to retain an adult tooth as long as possible, and it will last longer without an abscess than with one, if it can be retained without pain; but a deciduous tooth will last as long with a fistulous opening as it is wanted, as a general rule. Whatever palliation can be employed is all right. If it be healed up, it may be re-established by acute pain and inflammation, which risk is not worth taking, as a comfortable condition of the tooth for a limited time is all that is desirable in deciduous teeth. It is not reasonable that a fistulous opening can be healed up of a deciduous tooth as readily and as permanently as an adult tooth, when its fang is completely formed or ceased growing, the changing character and the increased vascularity consequent upon absorption of the deciduous roots favors the persistence of the fistulous openings in them.

We never use iodine about the teeth, as we have not seen much good in the use of it. Nitrate of silver, to get rid of undue irritation of the margins of the gums and on the mouths of fistulous openings, is sometimes useful, but never to heal a part up. The healing is favored more by keeping the root of a tooth open, except cotton and creosote and a tent of cotton in the fistulus in the gum, than medicaments; consequently they are of little account in children.

A fistulous opening is not of much account in children, unless it interferes with the general health, and this must be left to the judgment of the dentist. The fears of parents should have nothing to do with it.

There have been several able articles published recently on the treatment of deciduous teeth, which we hope will be read with interest and profit; and we have referred to the same subject long since, in articles which may not perhaps have met the eye of our correspondent. Every new inquirer after knowledge is an additional evidence of the onward march of our noble art, and lends new encourgement to publishers and contributors to push forward in the good work, and that love's labor is not lost.

J. D. W.

USE AND ABUSE OF WORDS.

"Besides the imperfection that is naturally in language, and the obscurity and confusion that is so hard to be avoided in the use of words, there are several willful faults and neglects which men are guilty of in this way of communication, whereby they render these signs less clear and distinct in their signification than naturally they need to be." Again: "One may observe, in all languages, certain words that, if they be examined, will be found, in their first original and their appropriate use, not to stand for any clear and distinct ideas. These, for the most part, the several sects of philosophy and religion have introduced. For their authors or promoters, either affecting something singular and out of the way of common apprehension, or to support some strange opinions, or cover some weakness of their hypothesis, seldom fail to coin new words, and such as, when they come to be examined, may justly be called insignificant terms."—*Locke on the Human Understanding.*

In directing attention to such an important, difficult, and delicate subject as the use and abuse of words, the writer desires to be distinctly understood by those who may feel sufficient interest to peruse the following remarks that, while recognizing certain defects in this respect in the literary efforts of others, he is deeply sensible of his own shortcomings in this and many other particulars; and furthermore, that, in entering upon the consideration of the theme, it is not in a mere captious, fault-finding spirit, but with the earnest desire that this communication may be productive of good, by arresting the attention of some whose sphere of usefulness as writers is limited by defects that could be readily eradicated, and which make them frequently the subject of unenviable comments on the part of many readers, who in doing so are actuated by no feeling of ill nature or malignity, but on account of the deep interest they feel in the advancement of science, would hail with unqualified pleasure a reformation in this direction.

It has been justly remarked by an eminent writer that "what a man is irresistibly urged to say helps him and us. In explaining his thought to others he explains it to himself." As an impulse such as that referred to by Emerson has led to the development of this effort, it is sincerely trusted that a like result may supervene.

Every one who takes upon himself to write, with the view of publication, must have one of two objects in view, viz.: teaching others something that is entirely new to them, or presenting old facts and ideas in a more clear, comprehensive, and attractive manner than they have been offered before. In either case, writers who desire to impress upon readers the thoughts existing in their own minds, must pay due attention to the medium employed for that purpose; in other words, say what they have to say in a plain, simple manner, so that the wayfarer, though a fool, may understand them. But it is the simple Anglo-Saxon words, and the Saxon way of putting them together, that some writers will not be content with, for there is ever a disposition to substitute long and frequently incomprehensible terms, and high-sounding combinations of them, in place thereof.

As a general thing, one takes little heed of the medium through which the thoughts pass from the silent page to the mind; and often the more pure and excellent the style the less conscious one is of its merits, so transparently are the thoughts seen through it. What was written is thought of and felt, but not how it was written. Now it is this kind of communication, which appears so easy, natural, and flowing that a mere child could produce it, that is so seldom met with, and so difficult of execution, that many are evidently unwilling to subject themselves to the severe and necessary discipline demanded to secure that clearness of diction which will bear thorough and close examination, and stand the severest test of scrutiny and time.

Who has not noticed how differently the same thing, said in different ways, affect them! It is welcomed in one case and repelled in the other. In one man's words will be observed a clear, terse, straightforwardness of expression; while in another there will be evinced a confused habit of thought, and a vagueness and an indirectness of purpose; what before was a medium as transparent as the atmosphere on a clear and cloudless day, or water drawn from the mountain spring, and through which the thoughts could be distinctly seen, is turned into murkiness and mist, apparently on the principle first enunciated by Talleyrand, that "language was given to man to conceal his thoughts."

Besides the impropriety of using words without thoughts to correspond to them, there is also a propensity to employ words disproportionate to the occasion, especially in the expression of feelings, agreeable or otherwise. This in some measure is attributable, no doubt, to poverty or carelessness in the use of words. Whatever it may be due to, it is highly objectionable, not only on account of a want of accuracy and truthfulness, but from the fact that the habitual use of disproportionate language is attended with the disadvantage, that the strong words are all wasted before they are needed; and when an occasion arises for the employment of earnest and emphatic expressions, the vocabulary is entirely exhausted.

J. H. M'Q.

(To be continued.)

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

MESMERISM.—In the latter part of November, 1861, Mr. E., a highly respected merchant, who was undergoing a series of dental operations at the time, desired to know whether we had any objections to extract a number of teeth for a lady friend of his while in a mesmeric or psychological condition. Having expressed not merely a willingness, but also the pleasure it would afford us to have an opportunity of observing the phenomena attendant upon an operation under such circumstances, an appointment was made to meet them for that purpose a few days later.

At the time named, Mr. E., in company with his wife and friend, made their appearance. The patient having taken a seat in the operating chair, Mr. E. placed himself in front, and, after looking at her fixedly for a few minutes, she passed into a deep sleep or trance, during which a large molar tooth and ten roots were extracted, some of which were quite difficult to remove. The patient made no resistance, but, on the contrary, was entirely passive, and gave no evidence of suffering. After being aroused from the trance, she stated, in response to inquiries, that she neither felt any pain nor had the slightest consciousness of the operation performed. The time occupied was about ten or fifteen minutes.

In directing attention to this, our object is to present an instance in private practice in which a patient, by a peculiar influence—call it by what name you may, mesmerism, psychology, or od-force—was deprived of ordinary sensibility, and submitted to one of the severest operations in surgery, not only without a feeling of pain, but also without consciousness. Compelled by this, and the statements of scientific and reliable persons, to recognize the fact that there is something more in this matter than the world is generally willing to accord to it, we are at the same time fully aware that its employment as means of inducing anæsthesia must of necessity be extremely rare.

As a general thing, this subject has been left in the hands of charlatans, who have made use of it on account of the pecuniary benefit to be derived from it. In a few instances, however, it has attracted the attention of philosophical minds in a spirit of candid inquiry, and, after making due allowance for the exaggerations of quacks, they have acknowledged, as the result of continued and careful observation, that they could not but recognize the subject as well worthy of the study of the philosophical physician, and that when available mesmerism should be employed as any other remedial agency would be. Prominent among these we find Prof. Mayo, the eminent physiologist, and Prof. J. K. Mitchell, who, as a man of science, a successful teacher and practitioner of medicine, is well known throughout the scientific world. Each of these gentlemen have published highly interesting and instructive treatises on this subject.* The following extracts, which are presented to the dental profession for the first time, are taken from Prof. Mitchell's essay:—

"No. 46. Mrs. D., aged thirty, a lady of genteel education and association, being too timid to bear the hand of the dentist, desired to be magnetized for the extraction of a tooth. So long as she supposed that the operation would immediately follow the sleep, she, who had been easily composed before, could not be soporized. It was only when the proposed operation was supposed by her to have been abandoned, that she could be mesmerized; and then, unexpectedly to her, the tooth was removed. The operation gave her severe pain, for she cried out, put her hand to her face, and opened her eyes, but almost instantly all signs of suffering were gone; when she was subsequently roused by passes, she had no kind of recollection of either the pain or the operation.

"No. 9. Miss E. P., who had been several times magnetized, was put to sleep for a similar operation. In this instance I called in the aid of a skillful dentist, and the tooth was extracted, not, however, without the expression of a sense of pain, but without calling the patient out of her sleep. That took place spontaneously some time afterward, while I and the dentist were discussing the subject.

"These cases show that the sense of pain is not uniformly destroyed by the magnetic state, as is alleged in almost all the treatises on the subject. But that the passibility of some mesmerized persons may be nearly if not entirely subverted, is demonstrated by the following case:—

"No. 118. E. B., at the Orphan Asylum, being mesmerized, was, *without her knowledge, consent, or expectation*, deprived of a jaw tooth considerably decayed, and for the extraction of which she had for nearly a month been endeavoring to summon nerve enough to go to a dentist. The gum was inflamed, and the operation was performed by unpracticed hands, with a dentist's common key. Several persons being present, each was desired to watch for any expression or sign of pain. None was detected. The face was calm and deathlike; the hands lay on her lap without the movement of a finger, and not a fibre of her system gave notice of any suffering. Yet the tooth resisted strongly, and the patient was, according to the testimony of her physician, Dr. Hays, and her dentist, Mr. Townsend, a very sensitive one.

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* Popular Superstitions and the Truths contained therein, with an Account of Mesmerism. By Hubert Mayo, M.D., of London, Professor of Anatomy and Physiology in King's College.

Five Essays. By J. K. Mitchell, M.D., of Philadelphia, Professor of the Practice of Medicine in Jefferson Medical College.

"A few days afterward, at her own request, the same person lost another tooth in the same way, and with exactly similar phenomena.

"In both instances, during her sleep, and soon after the operation, the patient was questioned as to her sufferings, and she replied that she had felt no pain.

"Some months afterward, the same person applied to me, through one of the physicians of the Asylum, to remove, after mesmerizing her, several diseased *teeth*. I promised to do so, provided she would come to my residence. There, in the presence of several of my friends, many of them physicians, the dentist above spoken of removed three teeth, and the stumps of two others, under the following circumstances:—

"Immediately after the extraction of the first tooth, so entirely painless did it seem, that an eminent law judge, who was present, observed that the tooth was set in for the occasion, that the gum did not bleed, and that I was deceived. The dentist immediately replied, 'No, sir, that tooth was as firmly in its socket as any other similar tooth; and here you see,' separating her lips, 'is the blood you look for.' After the removal of another tooth, it was suggested that the girl was impassive, and that a tooth should be pulled when she was awake, to test her capacity of endurance. Although I had learned from her physician and dentist that she bore pain badly when awake, I thought the suggestion a good one; and accordingly awoke her for the purpose. But it was impossible, by reasoning or entreaty, to obtain her consent, as she alleged that her sufferings when awake were too great for her resolution to support. I then took the dentist aside, and begged him to endeavor to push out one of the stumps with his thumb, or a concealed instrument. He accordingly desired to feel the tooth, as if for observation, and, with much address, suddenly applied his force to it; but a loud cry, and a violent projection of her body backward, gave indication of a suffering beyond her endurance. After a short lapse of time, this subject was remesmerized, and lost the rest of the bad teeth; showing, except in the very last operation, no apparent sensibility. Just as the last tooth, the fifth, was removed, there was a slight expression of pain. But to a question, she replied that she did not suffer. The same patient lately applied to me again, and a medical friend, Dr. Spencer, of Moorestown, New Jersey, removed a tooth for her when she was mesmerized, without any apparent sense of suffering."

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PLUGGING PLIERS.—A pair of very neat and valuable pliers designed by Dr. Wm. H. Allen, to be used in picking up and condensing pellets of foil, was placed in our hands a few days since. They differ from the ordinary pliers in not having broad and flat sides, but in place thereof being rounded, so that when the blades are brought together the instrument resembles an ordinary plugger. To prevent any lateral shifting, there are two small pins projecting from the inner side of one blade to pass into two holes in the opposite blade of the instrument.

A dextrous operator can readily take up the foil on the end of an ordinary plugger, and therefore would not be likely to use an instrument such as this all the time; there are, however, frequent occasions in which it will prove quite indispensable, and we therefore take much pleasure in recommending it to the notice of the profession as worthy of a fair trial.

FOREIGN SOCIETIES.—*Odontological Society.*—By the English journals we find that this association held its anniversary meeting on Monday evening, January 6th, 1862. Being an exclusively business meeting, the principal objects of interest were the announcement on the part of the President that Mr. Thos. Bell, F.R.S., had retired from the profession, and that the Council of the Society proposed his election as an honorary member; the presentation of Mr. Harrison's portrait, which had been requested at a previous meeting; and the election of Mr. John Tomes, F.R.S., as President of the Society for the ensuing year.

College of Dentists, England.—The fifth annual meeting of this Society was held on Tuesday evening, January 21st, 1862. Quite a lengthy report was presented by the Council, relating principally to the vexed question which divides the dental profession of England into two antagonistic bodies. Mr. George Waite, M.R.C.S., was re-elected President for the ensuing year.

Society of Austrian Dentists.—A dental society has been organized recently at Vienna, and meetings are held on the first Wednesday evening of every month at six o'clock, for the discussion of topics connected with the principles and practice of the profession. Additional interest and benefit is derived from the practical demonstrations which are made by the members in illustration of their views.

THE NEW YORK DENTAL JOURNAL—OCTOBER.

"POLISHING PLATES. By GEORGE BEERS, Montreal.—The importance of properly and efficiently polishing plates and *finishing* a set of teeth has never, in my opinion, been sufficiently considered. Many dentists think it a waste of time, but the time occupied in properly finishing a plate is fully repaid the operator in the additional appreciation of the set by the patient, and the consciousness of the dentist that he has faithfully performed every detail of his agreement. For, though the dentist may make no verbal agreement to 'polish the plate,' he is *expected* to do it, as much as the artist is to finish a painting, a sculptor a sculpture, or a jeweler a piece of jewelry.

"A set of teeth should be polished that it may be

'A theme of admiration and delight'

out of the mouth as well as in it. The plate should properly reflect the image, and each lining make a miniature mirror in itself.

"Patients who receive an unsufficiently polished set frequently complain of paying for 'half-done work'—that is, *if* they pay at all—and their ignorance of dentistry magnifies the fault sometimes to an alarming extent. Then, if it ever requires repairing, it may be taken to another dentist, who takes the time to polish it up, and the patient pays for the repaired set, with some such exclamation as—'Why, it looks better than when I first got it!' Thus, by a desire of saving a little time, such saving is *lost*—the operator is upbraided by his patient, and the four corners of the globe, if the latter visits them, hear the mournfully exaggerated tale.

"There are some dentists who will polish a plate for a *dental exhibition* as well as any jeweler, but when it is for a patient, their ardent desire of finishing it is remarkably lessened. One reason for this is, that they do not get a written diploma of merit from their patient, as they would from an exhibition, nor do they expect it will be so critically examined as in the latter; but here they are sadly mistaken, for the patient gives them a diploma of *demerit*, signed and sealed by his untiring tongue, and, to give more force to his arguments, may produce the set, embellishing (!) it with epithets, where it might have been embellished with *emery and rouge* to a much more profitable degree.

"There are a few little points previous to soldering which, if followed, will conduce to a more easy finishing of the plate: first, it is advisable to have the *dies* as smooth as possible, with no unnecessary projections that would deface it; secondly, in striking it up, care should be taken of dinging its surface with sharp hammers or uneven strokes, and no hammer used but one quite rounded on its beating surface; thirdly, care should be taken to solder the set well, flowing the solder as evenly as possible.

"After the set is soldered and quite cool, it should be boiled for a few minutes in sulphuric acid and water (about ʒi of SO^3 to ℥v of water) to dissolve the borax, and then it is ready for finishing. I commence by taking off and evening all superfluous solder, with the bur on my lathe; or by the use of scrapers and files I reduce it quite as well, but not so rapidly. There is nothing, however, like the bur on the lathe to trim the bottom of a lining or the lining itself After reducing or trimming the solder as I wish, I take a piece of the finest sand-paper and go over every part of the plate, taking care not to rub too hard or too long. To get in the little interstices of a plate, files of various shapes are used with great advantage. Some may think this sand-papering injurious to the plate; it is, of course, if used too much, like many other things, but it is taken for granted that the readers of the *Dental Journal* are not so stupidly devoid of a little common sense or judgment as to think I mean them to rub away till they rub through the plate. After the use of sand-paper, (it must be very fine,) I take a blunt, round-pointed scraper—the point something of the shape of the neck of a plain artificial incisor—and scrape evenly and easily over every part of the plate. It must not be used so as to *scale* off the metal, but so that it will smoothen and burnish at the same time. I find this very efficient to insure a good polish, and, if properly and carefully done, I will guarantee as fine a finished set as can be made. The edges of the plate should now be finished off neatly with a smooth file. I now take a cork wheel made to fit my lathe—of which wheels I use two, one pointed like a pyramid, the other like a common corundum wheel—and use it over every part of the plate with pumice-stone Wherever the cork wheel cannot get I use a pointed piece of cork or cane with the hand; after which I take a burnisher, and burnish every part of the plate, then follow with emery, giving the plate a thorough brushing.

"Previous to using the emery or pumice-stone, I would advise filling up all the interstices between the teeth and linings, to prevent the lodgment of food, etc., also to keep the pumice-stone or emery from getting in the spaces, which it is sometimes difficult to get out again. For this purpose some use amalgam, others gold or tin foil, and others osteo-plastic. The first takes too long to harden, and, for various reasons, is objectionable; the second cannot be made to stay in well without a waste of time in condensing and working it; the third has my preference, and, to tell the truth, I think that is all it is good for. It hardens soon, is easily put in, and can be colored with a little rouge to the *exact* shade of the gum, if required. After thoroughly washing off the emery with soap and water, I use rouge, wet with alcohol or water. There are various powders and polishes for plate-work, but, of all I have tried, I find nothing to surpass good rouge. Prepared chalk, magnesia, 'tripoli,' and a dozen others have all been tried, but rouge still maintains its supremacy.

"The above manner of polishing a plate is for gold or platinum, and in most parts for the vulcanite base also. But platinum requires a little different process for a *perfect* finish. The use of Scotch stone with pumice-stone will smoothen platinum well A correspondent of the *Chemical News* gives the following method of cleaning platinum. He says it may be cleaned very rapidly and perfectly by 'gently rubbing upon the dirty metal a small lump of *sodium-amalgam.* This should be rubbed on with a cloth, until the whole surface is brilliantly metallic; water is then applied, which oxidizes the sodium and allows the cohesion of the mercury to assert itself. The plate is now wiped off, and the platinum surface is left in admirable condition for the burnisher.' It is said that the 'wetted' metal does not suffer the least trace of amalgamation, and 'even when foreign metals, such as lead, tin, zinc, silver, are purposely added to the sodium-amalgam, the platinum surface suffers no disintegration.'

"To polish a set of vulcanite, I use the method generally recommended, viz.: with different shaped files, sand-paper, pumice-stone, emery, and rouge. The use of the cork wheel and pumice-stone on the vulcanite is a certain method of taking out the scratches of the file or sand-paper.

"In finishing off *partial* sets with clasps, the latter should be filed with a 'worn-out' file, inside and out, and the edge, or rims that touch the inside of the natural teeth, filed and burnished smoothly.

"When finishing off a plate it is liable to accident from bending during the process of polishing, also from bristles of the brushes catching between the teeth or in the clasps, and dragging the plate out of the hand of the operator, and from various other accidents that should be guarded against. It is by no means pleasant to break a tooth or bend the plate just when it is polished, and I am sure that this will seldom occur if the operator keeps his wits about him, and be 'canny,' as the Scotch call it.

"If a dentist can make a set to both *fit* and *look well*, he may be called a good mechanical dentist; but if he makes a set to fit well, and *not look well*, he may be called a good dentist, but he has careless taste, that has room for improvement."

THE VULCANITE—FEBRUARY, 1862.

The following extract was taken from a paper on *Facial Neuralgia*, read at a recent meeting of the Society of Dental Surgeons of the City of New York:—

"Mr. Lobb, in a paper read before the Harveian Society of London, ascribes idiopathic peripheral neuralgia to atrophy, by which the nerve is prevented from conducting normal sensations to the brain, and by which the polarity of the nerve is affected, thus giving the idea of pain in the diseased portion. Mr. Lobb then proceeds to argue in favor of the continuous galvanic current, as the only method of restoring the lost polarity and of stimulating the nerve to healthy nutrition. Dr. Carnochan, however, believes that cure can be effected only by the removal of the ganglion of Meckel, or its insulation from the encephalon. He describes three or four formidable operations in which he exsected the trunk of the second branch as far back as the foramen rotundum. All these cases were at least temporarily successful; though Dr. James R. Wood, at a meeting of the New York Pathological Society, held about the beginning of 1860, says that in one of the cases reported by Dr. Carnochan, and in which he removed the ganglion of Meckel, the pain subsequently returned. An inch or more of the trunk has been exsected, and afterward the trunk has reunited and sensibility has been restored. Excision was performed by Dr. Mott in one case thirty-six times, with temporary relief in each instance.

"When the operation of exsection is to be performed on the inferior maxillary branch, the soft parts are dissected off so as to expose the external plate of the jaw near the angle, and anterior to the posterior dental foramen. With a small trephine, enough of the external plate is removed to expose the nerve, which is then easily exsected. The hemorrhage is generally subdued without resorting to the actual cautery.

"Dr. E. Andrews, in a lecture published in the *Chicago Medical Examiner*, after indorsing Dr. Carnochan's theory of pressure upon the trunk of the nerve in the foramina, says, that other tissues can accommodate themselves to continuous pressure, but nerve trunks, under such circumstances, become pemanently troublesome. 'The treatment,' he remarks, 'should be in the direction to remove the constitutional diathesis on which the local constriction depends; as, for instance, the rheumatic, syphilitic, or malarious influences. If this does not suffice, and the pain continues, you may resort to surgical interference.'

"Dr. A. Wood says that in Edinburgh the use of narcotics injected under the skin in the vicinity of the pain is almost universal. Mr. Brenchley says that the Germans consider muriate of ammonia very valuable in facial neuralgia. It is given in doses of half a drachm every hour, in camphor mixture.

"M. Vautier reports a case in which facial neuralgia, accompanied by deafness, was cured by the extraction of a wisdom tooth.

"Dr. Van Archen, of Bogota, New Granada, reports an interesting fact relative to facial neuralgia caused by tobacco. He says: 'I have to mention a peculiar kind of neuralgia, occurring only in people who have worked for years in tobacco factories, besides being habitual smokers. In these, the body becomes so thoroughly saturated with nicotin, that occasional twitching of the muscles of the face occurs, which ultimately becomes an agonizing pain.' In these cases, antispasmodics and narcotics have no curative effect, but they generally yield to the following formula:—

℞.—Sulphatis quiniæ. grs. viij;
Pulveris cinchonæ,
Terri carbonatis, āā ℈j.
M. Divide in four powders.
S. One every six hours."

New York Dental Journal—March.

In an editoral under the caption *Who first filled Nerve Cavities?* the following account of an operation performed by the late Dr. Hudson is presented:—

"A short time since we were called upon by a lady, who had had the misfortune to break off the right central incisor; the root appearing good, we advised her to have it replaced by a pivot tooth. A small portion of the tooth projected above the gum, with an old filling in it; we excised the tooth with the cutting forceps to the edge of the gum, and discovered that the nerve-cavity was filled, and had been drilled out with an instrument about the size of the drill we wished to use for the pivot-hole. We drilled out the filling as far as it was necessary for the pivot to go, but found we had not removed all the filling. It was evidently filled to the apex, and in such good condition as to at once determine us to leave filling at the apex, and proceed to insert the tooth, supposing it had been lately treated by one of our modern dentists, who claim to be the first who ever treated teeth in this manner. We inquired who had performed the operation, as we always like to know the names of those dentists who, we are convinced by ocular proof, have been faithful to their work. The lady informed us that the tooth was filled by Dr. Hudson, of Philadelphia, when she was a girl, only seventeen or eighteen years old. A central incisor, by the side of this tooth, had been filled at the same time, having a large cavity on either side, and was in as good a state of preservation as when the operation was first performed.

"How long ago that tooth was filled we are unable to state with absolute correctness. We questioned the lady as closely as we could, without asking her age, out and out, but could only learn that she was afterward married, and now has children twenty to twenty-five years of age, so that the age of the filling could not be much less than thirty years.

"The lady gave us a graphic description of the manner in which this operation was performed, which will doubtless interest some of our 'original' nerve-cavity dentists. The doctor had a reputation of being very high in his charges, but also of being a very good operator. Her parents, believing that what was worth doing at all was worth doing well, and on account of her youth, desiring that she should have a permanent operation performed, concluded to send her to him. When he came to this tooth, and found it was decayed to the nerve, he informed her that, in order to save it, he should have to inflict considerable pain upon her, and she must be a brave girl, and bear it without flinching. He then heated a small instrument in a little lamp, and in an instant thrust it up the nerve-cavity. We will leave our readers to imagine her description of her feelings, while this instrument was doing its work. The dentist then proceeded to drill out the cavity and fill in the gold; the lady said it seemed as though it went up to the top of her head, and perhaps it did, but we only followed it the length of a pivot."

This is but one of many instances of the remarkable durability of Dr. Hudson's operations that frequently come under the notice of the members of the profession, and should be an incentive to each and all to devote the same *care, time*, and *labor* upon their operations that he did.

BRITISH JOURNAL OF DENTAL SCIENCE—DECEMBER.

"A NEW SUBSTITUTE FOR IVORY, HORN, ETC.—The collodion film, when formed on glass, is tough, and can be made of any desired thickness; and by the addition of gutta-percha, India-rubber, etc., a great range of elasticity, pliability, and hardness, it is said, may be produced. It has recently been proposed to apply these sheets of dried collodion (which, if made of good pyroxyline, will be colorless and transparent) to several useful purposes. Out of a mass of it, with proper tools, it is easy to work any desired form. The dried collodion is said to possess the physical properties of many of the most valuable materials used in the arts; it may be substituted for ivory, horn, wood, glass, etc., for the manufacture of statuary, billiard-balls, buttons, etc."

DENTAL REVIEW, LONDON—JANUARY.

NITRITE OF AMYL.—At a recent meeting of the College of Dentists, England, (Tuesday, December 3d, 1861,) "the chairman stated that some months ago Mr. Morrison, of Edinburgh, had transmitted to him a new preparation called 'Nitrite of Amyl,' which had a remarkable effect in quickening the action of the heart. He had handed the preparation to Dr. Richardson, who was so eminently qualified to test the value of such agents. Dr. Richardson has most kindly given the subject his attention, and had written a report thereon which his assistant, Mr. McPherson, would read to the meeting. He would, however, first call upon Mr. Williams to read Mr. Morrison's communication.

"Mr. Williams accordingly read the following letter:—

"GENTLEMEN: — The substance which accompanies this paper, the Nitrite of Amyl, was first brought under my notice by Professor Guthrie, to whose kindness I am indebted for the specimens now before you. Dr. Guthrie discovered, among other properties possessed by this fluid, that it has the very remarkable quality of almost instantly producing an *extraordinary increase* in the circulation of the blood. Whether this be a property of the substance, or whether it produces a new condition in the blood itself, I will not now stop to consider. I only wish to call the attention of the members to the fact, and shall rest satisfied with stating the method of using it. The method of applying it is simply to fold a small piece of blot-sheet so that it can be dipped into the substance. This slip of paper, now wet with the fluid, if held to the nostrils, and used in exactly the same way as ordinary smelling salts, will be found to have increased the pulse even before we have time to feel it. The pulse *immediately* begins to rise, and continues to do so at a *regularly increasing* rate. Whether in an arithmetical or a geometrical ratio, I have not yet had time to ascertain. One thing, however, is very clear, and that is, that, within one minute, a pulse of 80 is increased to 100, and within the next minute to 140. In Mrs. Guthrie I found the pulse increased about 40 degrees, which seemed to also increase the temperature in the same ratio, within the minute. In the Professor himself, whose pulse before I began was about 80, the pulse rose to about 120, posting on to 140, and so on to 164, when the determination of blood to the skin, which I took to be a very good index of what was going on within, hinted that it was time to stop. I then proceeded to take it myself, that I might realize the feeling. My own pulse, which is usually about 74, was found by Dr. Guthrie to be raised within the minute to about 120, which continued rising to 150, when he thought proper to stop. Judging of the effects of Nitrite of Amyl from my own feelings, I would compare it to that sensation which, after the excitement of a long race we feel when we come to a stand, and while perspiring feel the *full firm stroke* of the heart's beat at every breath we draw. This sensation, though attended with no bad results, might, if carried farther, be productive of mischief, and might most likely produce apoplexy. Professor Guthrie made the experiment of breathing it just after a race, and finding that pain came on, very wisely stopped. Had he continued, I have no doubt whatever but that he would have produced most unmistakable apoplexy. I mention this not to frighten you in any way, but to caution all concerned against carrying the thing too far.

"I have found it very useful in fainting fits, or in sickness from shock, In protracted recovery from chloroformization, and although that I have never had a case of suspended animation, have no doubt whatever but that this agent is not the least valuable as a means of saving life or restoring it when suspended.

"Mr. McPherson read Dr. Richardson's report as follows:—

"On April 22d, of the current year, I received from Mr. Rymer a bottle containing two drachms of Nitrite of Amyl. The specimen was sent to the College of Dentists, together with a report respecting the influence of the nitrite on the animal body, by Mr. Morrison, of Edinburgh, which report, after careful perusal, I reinclose.

"At the request of the members of the College of Dentists, I have investigated experimentally the physiological effects of the body in question. The following are the conclusions to which I have come:—

"Nitrite of Amyl is the most powerful excitant of the circulatory system known up to this time. It is more powerful than amylene, and much more rapid in its action than ammonia.

"A very minute quantity of the nitrite produces the effect. A small strip of bibulous paper dipped in the solution, and applied to the nose for a few seconds, being sufficient.

"The effects produced by the nitrite, on inhalation, are rapid reddening of the face and ears, a hot tingling sensation, fullness of the head, partial breathlessness, and extreme rapidity of the pulse. I have seen the pulse rise one hundred beats in twenty seconds during its inhalation.

"From certain analogies between this substance and amylene, I thought that it might be an anæsthetic, and experimented to test this view. On frogs its influence is most remarkable in this respect, for one of these animals, made insensible by inhaling the vapor, remained so insensible that I thought it was dead for six hours, but it ultimately showed signs of life, and recovered. On warmblooded animals, it acts less favorably, for although it reduces them to a state of extreme prostration, and renders them unable to move, they remain sensible to pain up to the moment of death, the death taking place suddenly, when the administration is carried too far.

"After death from Nitrite of Amyl, there is found great congestion of all the viscera; the lungs are deeply congested, the heart contains blood on each side, and the blood is dark and fluid. Like chloroform and amylene, Nitrite of Amyl applied to the surface of the heart, while the organ is pulsating, stops the pulsation.

"From the numerous inquiries I have made with this substance, I do not recommend its adoption as a medicinal remedy. Its effects are far too sudden and energetic to render its application safe as a general rule, for although in cases of syncope it might act, in some instances, as a powerful restorative, yet should there be any weakness or degeneration of the blood-vessels, the vehemence of the reaction induced would be attended with imminent risk of rupture and sudden death. Further, in persons in ordinary health and strength, the action set up by the substance is followed by such sudden transition to depression, (the pulse often falling a hundred in a few seconds,) that I do not consider the substance appropriate as a remedy, even in those whose organs and structures are free from any diseased condition.

"Mr. Robinson asked the chemical composition of the Nitrite of Amyl.

"Dr. Richardson gave it thus:—

"$C_{10} H_{11} ONO_3$.

"In reply to the Chairman, Dr. Richardson said that the use of the

Nitrite of Amyl was decidedly dangerous. Its action was most extraordinary on the heart. The beating was quickened with marvelous rapidity, and would cease altogether, without the least warning, instantaneously. Dr. Richardson explained at length his opinion upon the manner in which the Nitrite of Amyl acted upon the heart."

LONDON DENTAL REVIEW—FEBRUARY.

"CHLOROFORM IN DENTISTRY.—*To the Editor of the Dental Review.* SIR:—The case of the patient with diseased 'stump,' to be removed under chloroform, described by Mr. Hasler Harris, of Gower Street, in the last number of your talented Review, is a very interesting one, but easily to be explained; the sensibility of the conjunctival membrane of the eye, on which we so much depend as a test when administering chloroform, is due chiefly to reflex action of a somewhat complex nature; but the point of interest is this—if, in testing the eyes, this membrane is rubbed six or eight times in the *same* eye, the reflex action is exhausted; this eye, in fact, seems insensible when it is not so, while the opposite eye gives indications exactly correct. In my book on Chloroform, I have dwelt especially on this, and the fact that persons of a hysteric or excitable disposition, as correctly stated by Mr. H. Harris, are much less yielding to the influence of chloroform than other patients; it is also quite possible that the irritation of the stumps, acting on the fifth pair of nerves, in Mr. Harris's case, may also have increased the irritability of the conjunctiva of one side, (the right,) while the other was acted on as just explained. I think if I had seen the case, I could have explained it; for, in addition to these phenomena, it is now found we may have contraction of the pupil, too, on one side from such irritation, or spasm, of this self-same fifth nerve, not the third as previously believed; in fact, I have more than once seen a 'pin-hole pupil,' as the result of irritation of this kind, suddenly—in an instant—become a largely dilated pupil when the irritation was suddenly removed, as by extinction of a bad fang or stump, and the nerves supplying the iris and conjunctiva, lenticular ganglion, etc. are *quo ad* chloroform, nearly the same. A patient may even have very dilated pupil of one eye alone, according to the manner in which he reclines in a dentist's chair, from the gravitation of the normal fluid in the ventricles of the brain. "Yours, etc.,

"CHARLES KIDD, M.D.

"Sackville Street, Piccadilly, Jan. 4.

"P.S.—Perhaps you would allow me, *currente calamo*, to say a few words here as to the very disagreeable trial of a dentist recently, at Liverpool, for alleged seduction of a young woman under chloroform. It was there stated that chloroform has a tendency to excite sexual passion, and that patients under the hands of dentists, when narcotized, are generally found to talk in an obscene manner: this has gone the rounds of all the newspapers in Europe, still it is most decidedly untrue. I have steadily watched over ten thousand cases of chloroform administration, and I have not, in a single instance, heard obscene talk on what was referred to at that wretched trial. The idea originated with a dream of Dr. Ramsbotham, and some books published by Mr. Churchill, of New Burlington Street; but it is now denied strongly in America, and by all the best men in Paris, Vienna, and London, nor will the weekly journals allow it to be corrected, to the undeserved and enormous injury of the respectable men of the dental profession."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Removal with Reproduction of the Inferior Maxillary, and Preservation of the Teeth.—The Chicago Medical Examiner contains the following instructive clinical lecture on this subject, delivered by PROF. E. ANDREWS, at the Mercy Hospital, Chicago: "A few weeks ago, I removed from this man nearly the whole of the right half of the lower jaw, yet singular to relate, I have saved his teeth, which are now growing firm in the new bone which is replacing the old. The only instance like it which I ever heard of, is related in *Championniere's Journal*, in the following words:—

"'In this case the right side of the inferior maxillary was extracted *in toto*, with the articular condyle, and has been so perfectly replaced by the efforts of nature, that it is now almost impossible to discover which side of the jaw was removed by the surgeon. A singular peculiarity is the preservation of the teeth, which were left by the operator, attached to the gums as movable as a string of beads, and became subsequently consolidated by the closing up of the ossified layers secreted by the periosteum. Unfortunately, after having performed their functions for the space of two years, they one after another dropped out, but the patient nevertheless manages to masticate his food, and to speak distinctly.'

"In the case before us, the disease commenced some three months after a contusion of the head, and progressed until it necrosed the right half of the jaw from the symphysis back to the neck of the bone, the condyle escaping injury. In this condition he was brought to me. I made an incision along the base of the jaw, and seizing the dead bone with the forceps, drew it readily out. On examination, I was surprised to perceive that the sockets of the teeth were empty, they having remained attached to the gum, and slipping easily from their cavities when the bone was drawn down. The finger introduced into the wound felt the row of fangs, apparently clothed with periosteum, and strongly attached to the gums, but easily moved about. In some parts of the cavity, the periosteum had begun to reproduce a shell of bone, and taking courage from this indication, I determined to leave the teeth in position, in hope that the new growth of bone would inclose the fangs, and thus render the teeth firm and useful. The result has justified my expectations. You see that the arch of the jaw is becoming firm, and the teeth instead of hanging loose in the gums, are set strongly, giving the sensation to the finger as though they were set in cartilage, or other semi-indurated tissue. Whether they will drop out after two or three years' service, as in the case I quoted you, remains to be seen. Since the removal of the jaw proves the loss of the dental artery, nerve, and vein, it becomes necessary to explain in what manner the teeth obtain nutrition after the necrosis of the jaw. The teeth are not set in solid bone; on the contrary, there is a periosteum lining the socket, and intervening between the fang and the bone. When necrosis of the jaw occurs, this periosteal lining, like the similar membrane on the outside of the bone, may retain its vitality, and supply to the dental artery, by inosculation, the blood which is no longer transmitted through the dental canal. The absorbent action of the membrane upon the bone enlarges the space between the fang and the socket, and thus loosens the tooth, so that, at the time of operation, it readily slips from its bed, and the necrosed bone is drawn from it, as a boot is drawn from a foot.

"Many remarkable instances are on record of complete restoration of the jaw after removal for necrosis, but these two are the only cases which I know of, where the teeth were preserved, so as to have a living attachment to the new bone. You will find in practice, that the inferior maxilla is more likely to be reproduced after necrosis than any other bone in the body; hence, calculations should always be made on this event, and the following directions be observed :—

"First, the operation should not be performed early in the disease, unless there is some spreading disease, as epulis, which requires to be limited by excision. In cases of necrosis, which involve a large portion of the jaw at once, with little danger of subsequent extension, it is important to preserve the sequestrum in position until it is fully separated from the living bone, and if the irritation is not too great, until the new shell of bone produced from the periosteum has attained solidity enough to maintain the form of its arch.

"Secondly, before removing the bone, care should be taken to ascertain whether the teeth implanted in it are loose, and if so, to prevent their being torn from the gum with the bone. By a little care, the bone may be slipped downward, and the teeth left in position.

"Finally, if the arch of new ossific matter be not sufficiently consolidated to maintain its form alone, art may often supply the weakness of nature. The cases of death, of both halves of the maxilla are comparatively rare ; and, hence in ordinary cases, the sound side may be made to support the weak one. Before the operation of removal is performed, a dentist should be called on to take a mould of both upper and lower teeth on the sound side. By this method, he can prepare accurately-fitting gold plates to cap the rows of teeth and the gums. The lower plates should be soldered or riveted to the upper in the natural position, so that when placed in the mouth, the arch of the lower teeth will be secured by the support of the former. After the operation, if the new bone lacks strength, the chin will be found to fall over toward the affected side, but the insertion of the plate, and the application of a bandage, pressing the chin upward, will hold the lower maxilla accurately in position, until the consolidation of the new bone renders artificial support unnecessary.

Silver plate will do equally well, so far as mere mechanical strength is concerned, but it has the disadvantage of immediately turning black, and presenting a repulsive appearance to the friends of the patient. If a cheaper article than gold is required, probably the prepared gutta-percha, recently introduced for the plates of artificial teeth, would be found available. The preservation of the correct line of the chin is of great importance in the female sex, because any deformity in them cannot be concealed by a beard ; hence, you will exert yourself in such cases to obtain the most perfect of possible results. I have seen bungling efforts to keep the correct position, by wiring one or two of the upper and lower teeth together. But all such attempts are unskillful. The support thus obtained is not only precarious, but temporary; for where the whole strain is brought to bear on one tooth, the absorption of the alveolar process under the pressure, loosens and displaces the tooth, and often causes its speedy loss; but a pressure which is distributed over all the teeth of one side, is well borne, and may be long maintained. Similar mechanical devices are often the best possible splints for fractures of the inferior maxilla, particularly where the bone is broken into several fragments.

"In the surgery of this bone, gentlemen, your ingenuity must be prompt, patient, and fertile. Do not be discouraged by disheartening appearances. By faithfulness and skill, the face of your diseased or injured patient will at length assume a natural aspect, and you will obtain a success which often exceeds your most sanguine expectations."

"*On some of the Effects produced by the Retention of Carious Teeth in the Jaws.* By S. ADAMS PARKER, ESQ., Licentiate in Dental Surgery; Surgeon-Dentist to the Queen's Hospital, Birmingham, and to the Birmingham Dental Dispensary.—The following cases have, during the past seven years, come under my notice, both in hospital and private practice, and will form a continuation of those published in the *Lancet* in 1859:—

"CASE 7. *Fistulous opening in the lower jaw, attended by swelling and inflammation of the submaxillary gland, caused by a diseased wisdom tooth; removal of the tooth, and cure of the disease.*—In December, 1859, a gentleman consulted me respecting a fistulous opening in the lower jaw, near the angle, which was accompanied by a considerable amount of inflammation in the submaxillary gland on the left side. He stated that this evil had been in existence during nearly eight weeks; that it had gradually become worse, and had yielded to none of the usual remedies. He complained that it had deprived him of rest night and day, that the pain had been incessant, and the discharge from the opening continuous. The jaw had become fixed, so that little or no food could be taken, and the patient, when I saw him, was reduced to a state of great weakness.

"Having examined the mouth to the best of my ability under the circumstances, I found that the dens sapientiæ on the same side as that on which the disease was situated was considerably decayed, and very loose and tender to the touch. The patient, having an important engagement to fulfill on the day on which I saw him, deferred the extraction of the tooth till the morrow. In the mean time I recommended that he should use a fomentation of poppy-heads as frequently as possible until he should call the next day.

"Dec. 11th.—The mouth could be opened with somewhat more ease, so that I was the better able to reach the tooth. Still the jaw was closed sufficiently to prevent the entrance of a pair of forceps. I, however, removed the tooth by means of an elevator, and a considerable quantity of discharge followed the operation. Renewed fomentations were then advised.

"27th.—The fistulous opening had quite closed up, and the surrounding inflammation had abated. The patient could open his mouth as he had been accustomed to do before it became diseased.

"This was a successful case, and one in which the cure was rapid.

"CASE 8. *Fistulous opening in the lower jaw, caused by a decayed molar stump; removal of the stump, and cure of the fistula.*—In February, 1861, Eliza P., aged twelve years, a patient at the Dental Dispensary, sought relief respecting a fistulous opening in the cheek, which had been discharging matter for nearly two years, and which was supposed to have originated from the stump of the first lower molar on the left side. The crown of this tooth had been fractured in an attempt to extract it. Some few days after it had been broken, the surrounding parts became swollen, inflammation of the periosteum set in, followed by suppuration, and this finally ended in the formation of an abscess, which had broken externally and had continued to discharge up to the time when I saw her. She had been a patient at the General Hospital during a long time, and here the usual remedies had been resorted to without benefit.

"I removed the stumps with Thompson's elevator. They had been broken in so low as to preclude all possibility of easy application of the forceps, and the operation was rendered somewhat difficult. By the aid, however, of the elevator, and by a moderate steady pressure, they were soon extracted; and at the end of each fang I found a large sac, which proved beyond a doubt that the cause of the mischief had now been removed. A free discharge continued for about forty-eight hours after the operation, and in about three weeks the opening externally could scarcely be seen. The gums inside were nearly closed up.

"In the month of April, the patient having occasion to come again to the dispensary to undergo some other operation, I had an opportunity of seeing her, and found that the external mark was entirely obliterated, and that the second molar was gradually filling up the space caused by the removal of the first molar.

"CASE 9. *Neuralgic affection of the face caused by a number of decayed and loose stumps; removal of the stumps and subsequent cure of the neuralgia.*—A young woman, thirty-one years of age, consulted me at the commencement of January, 1860, under the following circumstances: For many months she had been suffering from pain in the jaws, face, ears, temples, and from great depression of spirits. She had no enjoyment in taking food, and suffered from constant indigestion and other unpleasant symptoms. She had been under medical treatment for a considerable length of time without any benefit, and the state of her mouth had never been inquired into; and thinking herself that the teeth might possibly give rise to some of her maladies, she consulted me upon the subject.

"Upon examination, I found the teeth in such a state as to warrant me in concluding that the cause of her illness was to be attributed in a great measure to their condition. There was not one tooth that was not partially or wholly destroyed by caries, and but one alternative suggested itself, which was that she should have extracted all that could not by the usual means be restored to usefulness. The patient, however, was reluctant to have so formidable an operation performed; but feeling somewhat convinced on her own part, that it might lead to her recovery, and being assured that the operation should extend over several sittings, she consented to a beginning.

"In due course of time the stumps of the molar teeth, both superior and inferior, together with several others, were removed, and some of the front teeth that were not in so bad a condition were filled and rendered serviceable. The pain in the head, etc. have since the operation gradually diminished, and in the May following she was quite free from any inconvenience. Her appetite is good, she sleeps well, and her food, which she enjoys, although, for want of grinders, not masticated as it ought to be, does not produce that irritation in the stomach which it formerly did.

"Nearly all the stumps had a bony deposit upon them, and one or two presented that condition mentioned by the late Mr. Sheely, in a paper read before the Odontological Society* in March, 1857.

"CASE 10. *Neuralgic affection of the face caused by decayed wisdom teeth; removal of the teeth, and cure of the disease.*—Harriet F., aged twenty-six, applied to the Dental Dispensary in April, 1860, for relief under the following circumstances: She had suffered for a length of time from violent pains in the inferior maxilla, shooting through the ear, and up to the temples; had no sleep at night, nor rest by day; could take nothing but soft food, on account of the pain produced when eating anything hard. No pain could be detected in any one particular tooth; the gums were slightly inflamed, and upon the lower front teeth a small quantity of tartar was deposited. I found that stumps of several teeth remained in the jaws, and as both the wisdom teeth in the lower jaw were decayed to the edge of the gum, the pains in the ear were accounted for.

"I recommended the stumps to be removed, to which the patient consented, and on the 26th I extracted the second bicuspid stumps, right and left side, in the lower jaw.

"28th.—No improvement. Removed first superior molar, left side, decayed to the edge of the gum.

"May 3d.—Pain not quite so bad, but still sufficient to prevent the patient from following her daily occupation. Removed both the inferior wisdom stumps.

"12th.—Pain entirely ceased on removal of the wisdom stumps.

"29th.—Cured.

"CASE 11. *Painful affection of the right malar bone produced by a carious wisdom tooth; removal of the tooth and cure of the disease.*—On March 28th, 1861, a young man, a patient at the Dental Dispensary, applied for relief for what he thought was a tumor in the mouth. For nearly twelve months he had suffered intense pain in the right malar bone, the cheek swelling at times to a considerable size, and the eye becoming quite black. Inside the mouth, between the cheek and the gums, was a hard substance, which was situated close to the right superior wisdom tooth. This was decayed to the edge of the gum, and painful when touched. I removed the tooth, and had the satisfaction of finding all the painful symptoms subside in the course of a fortnight, and the swelling in the mouth entirely gone."

Geological Changes in Teeth.—"No question in American geology seems more difficult of elucidation than the age and geological position of the so-called 'New Red Sandstone' of the Atlantic slope; some geologists referring it to the Oolitic or Liassic periods, others to the Trias, and others still lower, to the Permian. No true Permian forms (fossils) characteristic of that formation have yet been discovered, and the whole system is moreover destitute of beds of rock-salt and gypsum, which characterize mineralogically the Permian system, not only in Russia, but wherever else it has been recognized. During the past year Mr. Charles M. Wheatley has called attention for the first time to the existence of a bone-bed laid open by the excavation of a railroad tunnel in the shales and sandstones, of the same age as the so-called American New Red Sandstone, at Phœnixville, Pa. This bone-bed is about six inches thick, and contains abundant fragments of the bones of Saurians. Near the bone-bed is also a micaceous dolomitic sandstone, containing Saurian bones, *i.e.* part of a jaw, seven inches in length, with remains probably of batrachian animals, and the scales, teeth, and bones of ganoid fishes. So many teeth of Saurians, indeed, says Mr. Wheatley, have been collected and deposited in this dolomitic sandstone, that it has the appearance of an osseous (bony) conglomerate.

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* Extract from Transactions of the Odontological Society, vol. i. p. 37: "A very common appearance of exostosis, and one which is frequently ascribed to absorption, is a nipple-like projection of the apex of the fang."

"In some instances *the casts* only of the teeth remain, the substance of the tooth being converted into *dolomite*, but retaining the exact form of the tooth, with the sulcations as distinct as in the original; twenty teeth of probably three or four genera of Saurians, *all converted into dolomite*, occur on a piece of sandstone, six by three inches. It is a singular fact that while the teeth are dolomitic casts only, the bones in the same stone remain unchanged, retaining their original structure.

"Associated with the above fossils in the sandstone are numerous plant remains, mostly of a broad sulcated stem, without joints or branches; as far as noticed they retain the same width their entire length, and are from one-half to two inches broad, and from six to eight inches long.

"The shales, sandstones, and fossils of the Phœnixville tunnel bear a remarkable resemblance to those of Nagpur and Mangali, Central India, described by Messrs. Hislop and Hunter, *Journal Geological Society*, London, vols. x. and xi., and referred by them to the lower Jurassic age."—(*Annual of Scientific Discovery*, 1862)

Properties of Metals.—The following general observations upon this subject occur in an interesting paper, in the March number of the *Franklin Inst. Jour.*, on the "Alloys of Cadmium," by Dr. B. Wood, of Indianapolis:—

"*Scale of Hardness.*—Different methods of determining the hardness of metals have been adopted, none of which appear to be altogether free from objection. The most accurate mode, by means of a graduated punch worked by lever and weight, adopted by Messrs. Calvert and Johnson, is quite tedious, and the machinery too complicated for common use. Ordinarily the main object of examining a metal in respect to this quality is, not so much to determine the hardness of its particles as indicated by the common method of scratching the surface of another with it, or *vice versa*, nor to ascertain its interstitial compactness as by penetrating its substance by means of a pointed instrument under pressure of a given weight, but rather to find out the relative amount of force it, as a mass of a determinate form, will sustain without yielding or giving way, as compared with other metals in like form and condition. That is, we wish to know its state of coherence *as a body*, subjected to the test of pressure, in comparison with similar specimens of other metals, so as to determine our choice for a particular use. A piece of grindstone will *scratch* iron, though iron is much the harder. A substance may be penetrated in the direction of cleavage, or along the plane of crystallization, with ease, when at other points it would resist a greater force. The same may be inferred of those metals that are crystalline, or lamellar, in structure.

"Nor is it the absolute hardness of a specimen that is the object of practical concern, but simply to know which of any two or more metals, relatively considered, will, in respect to this quality, best answer the end.

"The mode adopted for ascertaining the relative hardness of metals represented by the table, is simple and convenient, and affords a good practical test for common use. Specimens of the metals to be examined are cast in the form of triangular bars, measuring at the sides about a quarter of an inch. These being applied edge to edge, and placed under pressure in a vice, the relative hardness of any two pieces is determined by the relative amount of indentation received by them. If the one be deeply indented or cut, and the other not sensibly, or but slightly notched, the former is reckoned at least one degree the harder—and if no impression be made upon it, it may claim a still higher figure in the scale; its precise place being ascertained by further comparison. If both specimens be strongly indented, although differing in degree, and the indentation of the one be no more than half that of the other, they rank in the same class: or if the difference be still greater, the one may take an intermediate place, or be ranked in the class to which it is most nearly allied, with the sign + or — attached, according to circumstances; or it may be designated by the numbers representing both classes. Thus an alloy of one part of tin and nine parts of antimony being deeply indented by the metals in class 5, while it also reacts upon them strongly, would, to be definite, be represented by —5. An alloy composed of lead and bismuth, each one part, and tin two parts, being nearly midway in hardness between the classes 4 and 5, may be represented by 4—5; or, for greater precision, by the use of a decimal, 4·5. These remarks apply also to the designation of other qualities.

"The metals in the scale are so arranged that to this test each will be found to cut or divide the one next above it, and to be divided by that next below, without perceptible reaction in either case.

"A mould for forming such bars (which, for want of a better, could be carved out, with a chisel, from a slab of soapstone) may be modeled so as to obtain, at the same casting, specimens for determining the qualities of flexibility and malleability, as below indicated.

"*Flexibility.*—All metals possess some degree of flexibility. A brittle metal admits of considerable flexion when in thin plates, and the amount will depend upon the thickness of the point operated upon. By bending similar bars of different metals, at a constricted point, (so as to prevent yielding at other parts,) and noting the number of degrees described before breaking, we arrive at an approximation in this particular. The metals represented by the table, flexed at a point one line in thickness, break as follows, reckoning the angle of breakage from that at which the piece cracks or *begins* to separate: Class 1, at 5° or less; class 2, over 5° and under 20°; class 3, over 20° and under 45°; class 4, over 45° and under 90°; class 5, 90° and upwards. A metal that may be uniformly bent the thickness named to a right angle may be accounted perfectly flexible. Beyond this the method is unsatisfactory, as the more flexible metals break gradually, sometimes thinning down to a mere thread before separating. Nor is it altogether satisfactory in other cases; and to assist our determinations, we have to take into account not only the angle of flexure, but the mode of fracture, or rather the manner of breaking, as the word 'fracture' is usually applied to designate the *appearance* of broken surfaces. Some flexible metals after a certain amount of flexion break short, as though rendered brittle by the process, like cadmium; others, as tin, separate by gradual attenuation. Of the more brittle kinds, some at a certain angle break through abruptly; others at the same point merely crack upon the surface of tensure, separating more and more as the strain is continued, and dividing completely only after a wide sweep. In short, some *tear*, some *break*, others *snap*. Again, some alloys will snap under a sudden strain that admit of considerable flexion if the force be gradually applied. A rigid description would express all these conditions, with terms appropriate to each. Moreover, in order to completeness in regard to this quality, independently considered, not only the amount of flexion, but also the force required to produce it, should be measured: but the *hardness* of the metals will afford some criterion in this respect. I have thought it not out of place, or unimportant, to thus indicate what remains to be done.

"*Malleability.*—The metals are classified in the scale according to the reduction in thickness they will bear under the hammer, without breaking, whether through the centre or at the margin. Specimens cast in the form of a bullet three lines in diameter, being subjected to this test, and the amount of reduction measured by means of a pair of callipers, it was found that the metals ranked in class 1 break upon being reduced less than one-tenth of this diameter (brittle); class 2 (slightly malleable) admit of being reduced from one to three-tenths (or nearly $\frac{1}{4}$ in bulk); class 3, from three to five-tenths ($\frac{1}{4}$ to $\frac{1}{2}$), being semi-malleable; class 4, from five to seven-tenths ($\frac{1}{2}$ to $\frac{3}{4}$). The metals belonging to this class admit of being hammered down to thin plates, but crack more or less on the margin, and therefore, although 'malleable,' are not ranked perfectly so. Class 5 includes all those metals that may be beaten down nine-tenths of their thickness without breaking or cracking—the margins remaining entire—and are characterized as perfectly malleable. They may be further classified according to the usual tables.

"When at a loss as to the precise place of a metal under examination, the nature of its cleavage or its subsequent 'behavior' under the hammer often assists decision; or it is represented by two figures, as in the case of other qualities.

"*Fusibility.*—The scale in the table is arranged to correspond to the actual melting point as indicated by Fahrenheit's thermometer, taking the unit to represent 100°. Class 1 includes those metals which melt at 100° and under 200°; and so of the others. Since the most careful measurements are liable to error by a few degrees, a latitude of ten degrees is allowed, (and it will be seen by reference to the table that the results of different experimenters usually vary still more widely,) so that if a substance melts at 90°, or a little upwards, it is placed in class 1; if at 190°, in class 2, etc.

"It may be thought that the *mean* of two whole numbers ought to be adopted, as the unit of measure, in classification; that, for instance, metals melting at 150°, instead of 100°, should be taken as the true type of the class expressed by the unit 1, allowing a range of deviation so as to include 50° on either side. But the scale was arranged with a view to the employment, when desired, of decimals corresponding to the figures which express the absolute melting point. Thus the fusibility of a metal melting at 150° or 175° would, to be definite, be indicated by 1·5 or 1·75; while, if its precise melting point was not determined, although found by comparative tests to fall somewhere between two numbers, we should make use of both to express it; as, 1—2, or 1·5—2, which indeed, in some cases, is about as near as we can approximate the truth by actual measurement."

The Teeth in Inherited Syphilis.—In the report of the proceedings of the Path. Soc. of London, in the *Med. Times and Gaz.*, it is stated that Mr. Hutchinson exhibited a portrait illustrating this abnormity.

"One of the central upper incisors was deeply notched, but the other had been so much destroyed by caries that its original form was lost. There was a clear history of syphilis. Respecting the casts shown by Mr. Nunn, Mr. Hutchinson stated that having seen them privately, he had at once, without being made acquainted with their history, pronounced one of them typical of syphilis, and the other somewhat suspicious, but by no means pathognomonic. In one the notches were deep, in the other much less so, while in one the teeth were much dwarfed, and in the other of nearly normal size. His diagnosis had been confirmed by Mr. Nunn's statement as to the history of the patients. In employing the teeth for purposes of diagnosis it was needful to attend to two points: first, the character of the malformation; and secondly, its degree. In both of Mr. Nunn's casts the character was the same, but the degree to which it had been developed was slight in the one and great in the other. The one, therefore, would warrant a confident opinion, while the other would only suggest a suspicion to be confirmed or otherwise by the patient's history.

"Dr. O'CONNOR asked if children who had suffered from primary syphilis in infancy had teeth of the form described by Mr. Hutchinson.

"Mr. HUTCHINSON replied that he was not in possession of any facts upon which to answer Dr. O'Connor's question. Unless, however, the syphilis occurred in very early infancy, he should not *a priori* expect that it would damage the teeth.

"Mr. BARWELL thought the method of diagnosing congenital syphilis by the teeth was on one hand too coarse, and on the other too refined. If we take children known to be the subjects of congenital syphilis, *e.g.* with loss of palate and nodes, we find sometimes that the teeth are perfect. He (Mr. Barwell) a little time ago brought before the Society a cast from the mouth of a child who, there could be no doubt, was syphilitic. When brought, the teeth, although considerably malformed, were said by Mr. Hutchinson not to be typical, not of the right shape. Mr. Barwell said that until confirmed by more evidence, he considered it uncharitable to conclude that a patient was syphilitic on account of any peculiarity in the form of his teeth."

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On Physiognomical Diagnosis of Disease. By THOS. LAYCOCK, M.D., etc.—"We have already had numerous opportunities of observing the physiognomical value in diagnosis of special features, as the jaws, palate, teeth, ears, hair, and the like. I will to-day summarize experience as to these points.

"*Jaws and Palate.*—A contracted, deeply-arched palate, has been often observed to coincide with idiocy and congenital imbecility, but I think, in persons of ordinary intellect, it sometimes indicates a tendency to feeble or irregular cerebral action, and to degeneration of tissue, as tuberculosis or atheroma. It is best known by the compressed bird-like form of the mid-face, but it may be found in idiots with broad faces. The development of the palate depends upon the general form of the upper jaw; not unfrequently that of the lower jaw follows suit, so that there is a rabbit-like appearance of the mouth. And this resemblance is the more striking when the teeth are so irregularly set or developed that the two central incisors of the upper jaw project beyond the general line of the teeth.

"Sometimes this appearance is rendered less obvious, because the upper lateral incisors, or the canines, are set back into the palate, so that the upper central incisors have room laterally. And occasionally you will find that there are supernumerary teeth developed far back in the palate (palatal teeth) in these rabbit-jaws, having the form of contorted wedge-shaped incisors. Sometimes, again, the lateral incisors are altogether wanting; but they are more commonly of imperfect form, resembling a small, round peg, or are of minute proportions. And when tuberculosis, or indeed imperfect general nutrition of any kind is beginning, it is often first seen in these teeth as decay or caries. Hence it happens that the development and decay of the upper lateral incisors are worthy of special notice in cases of hereditary phthisis, or other hereditary tendency to degenerate nutrition. The incisor teeth of the lower jaw much less commonly decay than those of the upper, but their arrangement is worth notice, for the projecting teeth of the lower jaw, known as *buck teeth*, often mark a tendency to gouty and rheumatic diseases.

"*Horse Teeth.*—There is another imperfection of this class which consists in a change of direction of the teeth and upper jaw, rather than a contraction and crowding. You will meet with persons whose upper teeth are not set at right angles to the jaw, but at a large obtuse angle, as in the horse, so that they project forward rather than downward, and even so far beyond the upper lip that it never covers them entirely. If you look at these persons you will see that the upper jaw itself projects too much, so that the under teeth do not meet the upper when the mouth is shut, but fall far within. This conformation often coincides with a receding lower jaw, but not necessarily. I have noted it most frequently in women with more or less of intellectual power, but it nevertheless indicates a congenital tendency to feeble or irregular nutrition and development, so that you will find other members of the family presenting more striking anomalies and defects.

"The *upper lip* presents modifications in form corresponding to those seen in the facial bones. A short contracted upper lip very commonly coincides with a retreating chin and a projecting mid-face, and, taken with these, indicates a tendency to feeble cerebral action. When there is no maxillary contraction, but absence or imperfect development of the intermaxillary and palatal bones, the two symmetrical halves do not unite, and we have *hare-lip*. Now, I am assured that a contracted lip in the parent is often seen to coincide with a defective palate and split upper lip in the child. Hare-lip is occasionally associated with congenital imbecility, as in the case already referred to, and with peculiarities of temper.

"We must refer all this class of degenerations, I think, to imperfect development of the middle region of the face, and especially of the intermaxillary bone. They are very common among animals as well as mankind. Rams and ewes, too highly bred, are apt, it is found, to produce lambs with prolonged upper jaw, and with lower jaw so receding that they cannot suck. Hence sheep-breeders avoid using rams and ewes, however highly bred, so soon as this tendency to maxillary degeneration is manifested. Highly-bred spaniels often exhibit irregularities of maxillary and dental development like those of their luxurious friends; there is a breed, indeed, of dogs, in which hare-lip is hereditary.* The *nose* may be either atrophied or monstrously large. The alæ may be so shallow that the septum is exposed, together with the corresponding portion of the nostril: sometimes the nostrils are so contracted that nasal breathing is difficult. When these characters coincide with a defective ear, rabbit jaws, short upper lip, and receding chin, you may diagnose a tendency to defective nutrition generally, and to cerebral debility in particular. The nose may, however, be monstrously long in such cases, as in the cretin children called Aztecs.

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* These dogs have also webbed feet, and webbed fingers sometimes go with hare-lip. My friend, Mr. Edwards, Lecturer on Surgery, has called my attention to the fact that he has found cyanosis from cardiac malformation to interfere sometimes with his treatment of hare-lip in infants. This coincidence of the two is interesting, if established, as showing the tendency of morphological degeneration of form to be associated with a corresponding degeneration of organs.

"The large, thick and shapeless nose usually accompanies big lips and a wide mouth; it is seen in a whole family of adult imbeciles, numbering seven men and women, who are in an asylum near Edinburgh. This is a kind of face apt to be developed in the younger members of a numerous family whose parents have a tendency to cerebral defect. These persons are wonderfully plain, yet by no means deficient in intellect, although not remarkable for talent. Their children, however, are apt to be imbecile or cretin-like, or variously defective as to the senses and intellect; so that these monstrously large features indicate a tendency to degeneration. The most striking examples of this kind among idiots are to be found in endemic cretins, such as those of the Alpine valleys."—(*Med. Times and Gaz.*)

"*Standard of Health.*—Given symmetry of form, what points in the physiognomy indicate a good state of health and constitution of whatever temperament the person may be? 1. The skin should be healthy; this is indicated by a freedom from dry epithelial scales or scurfiness, both of the skin and scalp; a certain suppleness, the result of due secretion of sebaceous fluid; a firmness of texture equally removed from transparent thinness and coarse thickness; a freedom from chronic congestions, patches of varicose vessels, vascular nævi, or any skin diseases, whether parasitic or diathetic. 2. The skin products, whether appendages,—as hair, nails, and teeth,—or secretions, as the pigmentary, sebaceous, or perspiratory, should be normal and healthy. The expression of the eye should be free from peevishness or irritability (for these often mark a tendency to shortness of life), there should be no *arcus senilis*, or infiltration of the lower eyelid, or marked vascularity of the upper lid. The complexion may be of any temperament, but should be good of the kind; there should be no signs of unhealthy blood, as a peculiar pallor, or icteric tint, or duskiness of hue. Perhaps the best single criterion of a sound, enduring constitution, is to be found in the character of the hair and teeth. Persons tending to longevity have usually sound, well-enameled, well-set teeth, continuing free from decay into old age; and their hair is thick, not soon gray, nor falling early. In such persons the general powers are vigorous, and it is only some visceral disease or acute fever which shortens life. If to the signs of good health you can add good conduct, and the fact of longevity being hereditary in the family, the individual has a good chance of long life."—*Dr. T. Laycock.*—(*Ibid.*)

Exsection of Nerve for Relief of Neuralgia.—The Königsburg correspondent of the *Med. Times and Gaz.* states that PROF. WAGNER, of that place, "had recently under his care a patient who had for thirty years suffered from violent neuralgia of the infra-orbital nerve, the seat of which was evidently peripheral, but which had baffled all medical treatment. Two years ago Professor Wagner removed a piece of the diseased nerve, eleven lines long, and thereby literally cut away the pain. For fifteen months the patient remained perfectly well, but after that period fresh fits of neuralgia came on, which, although at first slight, soon resumed their previous violence. The internal administration of narcotics, and the subcutaneous injection of the sulphate of atropine, had no beneficial effect whatever, so that another operation became necessary. Professor Wagner had convinced himself by previous experience that a newly-formed nerve is so firmly soldered to the sides of its canal that it is impossible to extract it, and that it can only be removed together with the bone surrounding it. The margo infra-orbitalis was laid bare, the peri-orbita removed from the orbital surface of the body of the upper jaw, and resection of the parts immediately surrounding the whole infra-orbital canal performed by means of the stitch-saw. The piece of nerve thus removed was eighteen lines long. The tic douloureux persisted for a few days after the operation, probably in consequence of exudation in the antrum Highmori, by which the end of the nerve was irritated. After the pus had been allowed to escape, the pain entirely ceased, and has not since returned."

"*The Physiognomical Muscles.*—M. DUCHENNE DE BOULOGNE, who is well known by his valuable writings on medical electricity, lately brought before the Academy further results of his researches on the physiognomical expressions, as caused by the contractions of the individual muscles of the face. According to him, the frontal muscle expresses attention, the orbicularis reflection, the corrugator pain, and the pyramidalis nasi sadness; the zygomatic major expresses joy, and the zygomaticus minor grief; if bitter tears are shed, there is always a contraction of the levator alæ nasi et labii superioris; the transversus nasi expresses disdain, and the buccinator irony; the triangularis labiorum is the muscle of sadness and also of aggression; the levator menti expresses disdain and doubt, the platysma terror and anger; the quadratus menti is the complementary muscle for irony and aggression; the dilatator narium is the complementary muscle of violent passions; the masseter expresses anger and rage; the palpebralis contempt and grief; the orbicularis inferior benevolence and gladness; the eccentric fibres of the orbicularis oris doubt and disdain; the concentric fibres of the same muscles aggressive and bad passions. The upward gaze conveys recollection; the oblique gaze, when directed upward and sideways, ecstacy and 'sensual delirium;' the oblique gaze, when directed downward and sideways, defiance and terror; and the downward gaze sadness and humility."—(*Paris Correspondent of Med. Times and Gazette.*)

"*Odontological Society.* March 3, 1862. The President, Mr. Tomes, F.R.S., in the chair.—MR. HARRISON drew the attention of the Society to a newly introduced form of stopping for filling teeth of the kind called osteoplastic. A paper 'On the Absorption of Bone and Dentine,' was read by Mr. Bridgman, of Norwich. The author considered that absorption of the various tissues was to be explained by regarding them as series in a voltaic circuit where absorption or solution and redeposition was the result; thus he regarded the newly-forming Haversian canals as positive toward the absorbing canals, (or those becoming converted into Haversian spaces, as described by Messrs. Tomes and De Morgan,) which were negative. By the electrolytic decomposition of albumen, he had produced a substance which, in its physical and microscopical characters, he stated closely resembled cartilage as formed in the body."—(*Medical Times and Gazette.*)

"*Injurious Action of Iodine on the Teeth.*—M. STANISLAS MARTIN has found, as the result of repeated inhalations of iodine in the treatment of phthisis, that the gums become very sensitive and swollen. The alveolo-dental periosteum next suffers, and the teeth soon lose their solidity. The mouths of some persons, however, seem insensible to the iodine. He has formerly shown that camphor and sugar exert a deleterious action on the teeth themselves, decomposing them and leading to their loss; and he believes that the same is true with regard to iodine, which especially attacks the carious teeth, and those the enamel of which has become damaged by the heat communicated to the mouth by smoking. He has now under examination some teeth completely saturated with iodine.—(*Bull. de Thérapeutique*, and *Ibid.*)

Solubility of India-Rubber.—"Common India-rubber, that is, the unmanufactured, not vulcanized gum, is the only kind that is soluble under ordinary circumstances, dissolves readily enough in benzole or naphtha; but the solution, even when thickened by admixing some substance like zinc-white to give it a body, is too *sticky* to answer the purpose of moulding, or in place of vulcanized rubber. The gum is only partially soluble in any of the liquids generally employed. Bisulphide of carbon dissolves about 70 per cent., ether about 66 per cent., and chloroform stands between the two. The rectified coal oils, camphene, and the light rosin oils are likewise good solvents; but all of them leave behind a bulky dark-colored residue, which is less adhesive than the soluble portion. *Vulcanized* rubber, the form in which this gum is almost exclusively used, is *not* soluble in any of the substances mentioned, unless digested with them for months; but it swells to about eight times its bulk in bisulphide of carbon, benzole, camphene, etc., which dissolve a portion of the sulphur, that which is not chemically combined. To mend broken articles of vulcanized rubber we use a solution of non-vulcanized gum with a little gutta-percha in bisulpide of carbon or chloroform."—(*Amer. Drug. Cir.*)

"*Necrosis of the Upper Jaw, and Death of a Child Six Weeks Old, from the Emanations of Lucifer Matches.*—M. Grandidier, of Cassel, mentions, in the *Journ. für Kinder*, the case of a child, six weeks old, who, after all the symptoms of abscess in the antrum, had necrosis of the upper jaw, and gradually sank. The cause of these phenomena is supposed to be a large box of matches, containing at least one thousand, which was placed in the vicinity of the child's cradle. The room being small and ill ventilated, the fumes of the phosphorus had probably contributed to the affection of the bone. M. Grandidier is so incensed at this neglect that he wishes us to go back to the flint and steel, and give up lucifer matches altogether."—(*Lancet.*)

"*Description of a Process for the Reduction of Silver from its Solutions.* By FRANKLIN PEALE.—The process is very extensively employed in the refinery of the Mint of the United States, where it was introduced by myself when melter and refiner of that establishment.

"It is based on the well-known affinities of chlorine and silver, and their ready separation by zinc and sulphuric acid. It had its origin in the laboratory of the Swedish chemist Arfwedson; and was used by Mr. P. N. Johnson, of London, in whose refinery I became familiar with its details, and was subsequently enabled to improve it very materially, by the substitution of a solution of salt, in place of the hydrochloric acid previously employed.

"By adding in excess a saturated solution of common salt to the solution of nitrate of silver, the metal is thrown down, as an insoluble salt, the chloride of silver. The precipitate must then be carefully washed until it is entirely 'sweetened,' or freed from the presence of nitric acid.

"Granulated zinc must then be added to the chloride, and stirred through the mass. The finer the zinc has been granulated, the more rapid will be the reduction. Dilute sulphuric acid must also be added, and the whole stirred until the reduction is complete; which will be known by the entire disappearance of the white chloride, and its conversion into a gray powder. A new set of affinities takes place with great rapidity in this combination, and the chlorine is liberated from the silver, which takes its metallic form, as above stated, in the appearance of a gray powder.

"The zinc having been added in excess, must now be removed by the addition of dilute sulphuric acid; after all action has ceased, the solution of zinc must be decanted, or drawn off with a syphon, and the silver washed until '*sweet*,' or free from acidulous matter, after which it may be dried by pressure, or the simple application of heat in a pan over the fire, when it will be ready for melting, with the usual fluxes, or re-solution with nitric acid.

"This process, as you will perceive by my brief description, is rapid and easy; is not subject to loss; it will yield, in the terms of trade, pure silver, of a quality from 994 to 998 thousandths fine, and is therefore well adapted to the preparation of pure nitrate of silver for the use of photographers and all others who have need of a reliable article."—(*Am. Jour. Photography* and *Amer. Druggists' Circular.*)

Chemistry of Glass.—In the report of the proceedings of the Polytechnic Association of New York, in a contemporary, it is stated that PROF. SEELY made the following remarks in relation to this subject: "Any one acquainted with the laws of chemical combination and with the composition of glass would have anticipated that the silicic acid might be replaced by boracic acid; silicon and boron being so similar in their properties. It is well known that this is found to be the case; the borates, formed by the combination of boracic acid with the alkalies or with metallic oxides, are glasses similar in their properties to the silicate glasses, but somewhat different; for instance, they are more fusible. One metallic oxide may also replace another in the combination. Faraday was the first to suggest that the oxide of zinc might be used in the place of oxide of lead, and a glass is thus produced, superior, I believe, for certain optical purposes, to the lead glass. Now the point that I wish to make is, that this law indicates a wide field which has not been explored. For instance, the metal cadmium is analogous to zinc, and it is probable that a glass in which the oxide of cadmium should replace the oxide of zinc would have properties similar to those of the zinc glass, but still not precisely the same. Let us try it. Rubidia and cæsia too, the newly discovered alkalies, would, doubtless, make glass with peculiar properties; and it is conceivable that these properties might be of sufficient value to justify the use of even so rare and costly substances as the oxides of rubidium and cæsium. For instance, if the lustre of the glass imitated more closely than any other the lustre of the diamond and other precious stones, the cost of the materials would be of trifling importance."

MISCELLANY.

The Paris correspondent of the *Lancet* writes that "an attempt has been made by a French chemist, M. Couerbe, to deduce from analytical examination the age of exhumed bone. Some time back, two human skeletons were found in stone coffins at Vertheuil, in the department of the Seine and Oise. M. Couerbe submitted the shoulder-blade of one of the skeletons to chemical examination, and ascertained that it contained 10 per cent. only of organic matter. Now as fresh bone contains 33 per cent., it followed that 20 parts of the animal matter had disappeared since inhumation occurred. It having already been ascertained by M. Vogelsang that bones which had been buried 1100 years scarcely contained any trace of animal matter, M. Couerbe presumes that 3 per cent. of organic matter disappears in the course of every hundred years, and by this approximation arrives at the conclusion that these particular skeletons have been buried for the last 700 years—a fact, it is said, strongly corroborated by the other archæological evidences in connection with the subject. Sûch a rule can, of course, under ordinary circumstances, result in little more than an approximative estimate; but possibly further and more extended observations may lead to its future more precise and reliable application."

In a letter to the *Lancet* on the condition of the mouth in idiocy, Dr. Thomas Callaway, of Algiers, suggests that the arching of the palate in idiots "depends upon the imperfect function of the sphenoid bone, the growth of which being arrested, the vomer does not receive that impulse which should compel it, in its turn, to push downward and forward the palatine processes of the superior maxillary bones. Does this arrest of development of the sphenoid depend upon a want of local nutrition, or is it the result of that deficiency in the great nervous centre with which these unfortunates are afflicted? Would it not be interesting to know whether the palates of the deaf-dumb present any analogous deformity?"

In treating of the varieties of insanity, Dr. John Conolly observes, (*Med. Times and Gaz.*,) that "when investigating any case exhibiting mental peculiarity in children, it is generally found that there has been some marked irregularity in the development of the body during early growth. It may have been most commonly noticed, because then most obvious, in the appearance of the teeth, and it may have been in the proportions of parts of the osseous system, and less conspicuous, or more evidently in the bones of the head, where it has generally been more anxiously regarded, and not without reason; such osseous irregularity, whether of deficiency or excess, being generally associated with irregular development or some existing imperfection or past disease in the brain itself. The mental symptoms about which the practitioner is consulted in a child which has no manifest signs of bodily ailment, may have had a remote origin. There may have been imperfection in the first stages of uterine life, occasioned by unhealthy conditions of either parent, or by accidental shocks and impressions experienced by the female parent during pregnancy, or by various diseases or accidents after birth, or by bad care and nursing, or errors in early management. The consequences may be either the retarded or precocious development of the child's mental capacity, or the irregular and disproportionate development of particular faculties, or, to a greater or less extent, imperfection, or even general disturbance of all."

In his quarterly summary of medical progress, (*Amer. Med. Monthly,*) Dr. L. Elsberg gives the following case from the Gaz. des Hôp., by Dr. Faure, in which wine, in large and frequent doses, proved useful in arresting hæmorrhage: "A previously healthy woman had suffered for fourteen days with extremely profuse bleeding from the oral cavity, together with asthma, constipation, and purpura hæmorrhagica. All available means having been tried without success, and death being imminent, alcoholic intoxication was induced and kept up by giving every fifteen minutes a glass of old Bordeaux wine. On the next morning the bleeding had ceased, and other symptoms were also ameliorated. A chronic scorbutic condition of the gums continued for some time longer."

Dr. Ebstein has communicated to the Austrian Academy of Sciences (*Constatt's J. d'Pharmacie,* and *Am. Drug. Circ.*) "a series of experiments on the action of saliva upon starch. Like Leuchs, Frerichs, and others, he found that starch in contact with saliva, even in the presence of some acid, to a certain extent is converted into dextrin and sugar, and that the secretions of the stomach, though of an acid reaction, do not prevent this change. Dr. Ebstein remarks, that while secreting the saliva necessary for his experiments, he found it advisable to abstain from *smoking,* which, we suppose, he otherwise considers a legitimate occupation during physiological experiments; he does not, however, suggest the same caution in regard to *chewing.*"

In noticing a statement by Dr. Phipson, in the *Chemical News,* that platinum may be crystallized by a lengthened exposure to the action of warm nitro-hydrochloric acid, Mr. Alfred Noble observes that a similar effect may be produced in a few hours by boiling scrap platinum in the same acid.

M. A. F. Mennons has patented in England (*Chemist and Druggist*) the following "*odontalgic elixir* for the treatment of caries and other diseases of the teeth." The practical value of this preparation cannot be very great, yet a knowledge of its composition may prove useful to the profession. "To about ten quarts of cognac brandy are added cochlearia, two and a quarter pounds, (avoirdupois;) milfoil, thirteen and a half ounces; pulverized cloves, one ounce; pulverized cinnamon, one ounce; pulverized cochineal, two ounces. The mass is left to infuse for fifteen days; after which it is filtered and completed by the addition of tincture of quinquina, ten ounces; concentrated essence of anise seed, one and two-third ounces; concentrated essence of mint, two-thirds of an ounce."

An exchange states that "R. Mushet, of Coleford, England, who has already taken out a great number of patents for mixtures, and processes connected with steel making, has lately secured another patent for making improved steel, as follows: pulverized pig iron is mixed with pulverized iron ore or oxide of iron and manganese, and these are smelted in a crucible. Cast steel of a certain quality is thus produced direct from pig iron, but a superior quality is obtained by adding to the mixture some pulverized wolfram and chrome ore or oxide of chromium."

Mr. Krafft recently reported to the Polytechnic Association of New York (*Ibid.*) that soluble glass may be made by melting together, in a crucible, powdered quartz, soda, and charcoal, six fusions being necessary to make a perfect mixture, which will dissolve in one-fifth its weight of water.

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, JUNE, 1862. No. 11.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

We did not think it would be necessary to say anything more about plugging forceps when the last article was finished, but having seen some attempts to imitate them, perhaps it might be of some use to say a few words more about them.

The forceps have been constructed with strict reference to economy of space in the mouth, with respect to the weight and length of the beaks, yet there must be sufficient strength to apply the amount of force requisite to make the degree of consolidation required. If the beaks are too thick, they are in the way, and you cannot see as well exactly how to work them; if they are too long, you cannot apply them to the back molars without forcing the mouth uncomfortably wide open; if the beaks are too much curved, they tend to slip down on the necks of the teeth when pressure is applied. They must have that kind of set, so that, when pressure is applied, the force will be as nearly as possible in a direct line across the body of the tooth, especially when applied to the large molars; besides, the power should be so directed as to pack the gold directly toward the bottom of the cavity. The counter-beaks of Fig. 2 should be flat on their faces, so that they will not slip off of the tooth when pressure is applied, and terminate with a straight line, not a semicircle, as some we have seen, as they will not hold on to the tooth. The packing beaks should be made with a gradual taper, so as to have no weak point; the spring should be equal along the whole length, or they will break when force is applied. Fig. 2, for the bicuspids of the lower jaw, should be made as nearly straight as possible, with a slightly elevated, condensing point, well defined. If the beak is too much curved, it cannot be passed as far between the teeth as is desirable, and the object of the use of the forceps is defeated. The pitch of the beaks should be at such an angle that the handles of the forceps will be easy to the mouth when the beaks are applied to the tooth, so that while working the instrument the mouth will not be forced open too widely, and that the operator can see the plug all over the surface while applying the force. Doubtless, to obtain this angle for Fig. 1, each dentist ought to adapt it for himself.

There are many plugs on the necks of the molar teeth, where we cannot well apply the forceps. In these cases of course we must do as well as we can without them, but we use them whenever we can. Every dentist must select the cases to which he can best apply them. Some hard-working men may not require the forceps in any case, but that is no reason why others should not use them to advantage, with reference to economy in the time and labor.

Fig. 5.

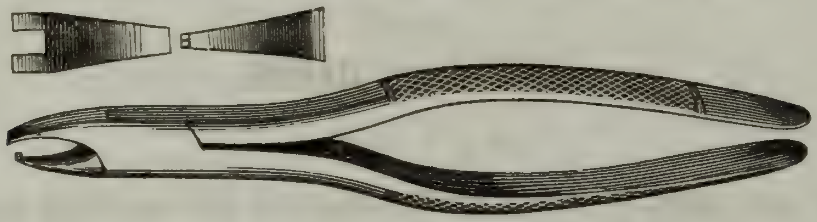


Fig. 5 is a straight forceps five and a half inches long, with the packing-beak a very little shorter than the counter-beak. It is used principally for the superior bicuspids and canines when the plug extends close up to the cusps. The reason of this will be readily seen.

(To be continued.)

A CASE OF IRREGULARITY OF THE TEETH.

BY H. MEREDITH WHITE, M.D.

The following case of irregularity presented in April, 1859. The patient was in his twentieth year, and in good health:—

The right superior lateral incisor stood entirely within the arch of the lower jaw. The left superior lateral struck upon parts of the left inferior median and lateral incisors, and, by the constant friction to which it was exposed, had been so much worn on the cutting edge that the dentine could be seen between the anterior and posterior plates of the enamel—on this account it was shorter than the lateral of the right side.

The arch of the upper jaw was nearly as small as that of the lower, and the spaces that the laterals should have occupied were but half sufficient for their accommodation.

The position of the teeth before and after treatment will be seen by referring to Figs. 1 and 2.

In regulating these teeth, two things were to be accomplished: 1st. To enlarge the arch. 2d. To place the irregular teeth in their proper places. These two steps were accomplished at the same time. As the labial surfaces of the laterals were somewhat round, resembling canine teeth, it was evident that by forcing the teeth forward they would act as wedges, and widen the arch, and at the same time would gain their proper places. By the aid of inclined planes, one for each lateral, adapted to a plate fitting the under jaw, this was gained. In addition to this a plate was made for the upper jaw, having crib-bands for the first and second bicuspids of each side, and a bar to run around in front of the upper arch, standing away from the labial surfaces of the teeth about an eighth of an inch, and soldered to the crib-bands; patent thread ligatures were secured to the necks of the laterals, and the ends drawn tightly around the bar and tied. These ligatures were renewed every three or four days so as to keep up a continual traction. The inclined planes were worn continually, thus making them powerful auxiliaries; in the mean time, by propping the teeth apart about a quarter of an inch, they allowed the laterals to slip over the lower teeth. From time to time the bar of the upper plate was lengthened by placing it over the arm of a small anvil, and striking it with a small riveting hammer. This was done to make room for the teeth as they advanced. The central incisors were coming forward at the same time, and increasing the size of the arch.

Fig. 1.

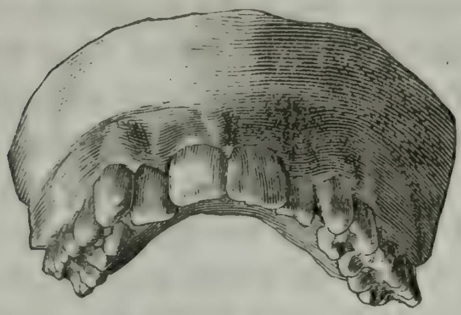
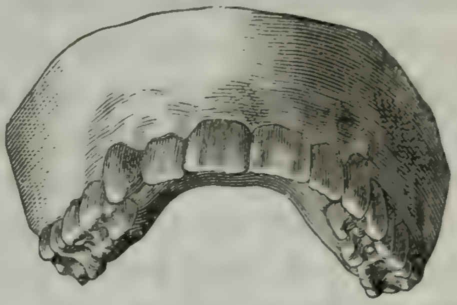


Fig. 2.



After pursuing this course for three months the teeth had arrived at their proper places. The inclined plane and the plate with the bar were now dispensed with; but now a new plate for the upper arch was made, with pieces fitting against the back parts of the four incisors, in order to prevent retrocession or turning of the teeth. This plate was worn nearly two months, so as to give the teeth sufficient time to become firm in their sockets. The plate was then left off, there being no further use for it. The teeth were regular, and looked very well; but the shortness of the left lateral, referred to above, was objectionable. Concerning this I consulted Dr. J. D. White, who directed me to tie a string very tightly around the neck of the tooth, under the free margin of the gum, which, in a few days, would cause the tooth to protrude, and thus make it longer. He said that he had availed himself of this method in many cases where there was a shortness of one or two teeth, and had permanently lengthened teeth in this way, but that great care must be taken to keep the irritation within proper bounds, and that growing teeth could always be lengthened in this manner, and occasionally matured teeth also; but success in the latter was not always certain.

I tied very tightly a patent thread ligature around the neck of the short tooth, and under the free margin of the gum. I saw the patient in three days, and observed that the tooth projected from its socket to a slight extent. The ligature was still retained, and the patient was seen again in three days. The tooth had already lengthened sufficiently; there was considerable irritation and some pain. The string was removed, and the patient directed not to use that side of the mouth for several days, and occasionally to apply a little pounded ice in a rag to the gum above the tooth, and to return in a week. The patient came as directed. All irritation had subsided, and the tooth had shortened, but not to its original state.

By practicing this treatment every alternate week, so as to give the tooth time to recover each successive shock, the end was accomplished in six weeks. The tooth is as long as its fellow of the other side, and after having its rough edges dressed off, presented a good appearance.

It has now been over two years since the affair was concluded, and so far no ill effect has arisen from this novel plan of lengthening teeth, which has been very successful in the hands of him whose advice I followed.

It may be proper to add that during the first fifteen days of regulating teeth, by means of any apparatus, there is always more to fear than during the subsequent treatment, since violent periostitis is apt to occur, and if it does, it is more difficult to treat, and more destructive in its consequences than apparently the same amount of inflammation occurring during the treatment of a case of irregularity that has been under way for a longer time.

PHILADELPHIA, May 17, 1862.

EXPERIMENTAL OBSERVATIONS ON THE ACTION OF ARSENIOUS ACID ON THE WEB OF FROGS' FEET.

A paper read before the Pennsylvania Association of Surgeon-Dentists, Tuesday Evening, May 13th, 1862.

BY J. H. M'QUILLEN, D.D.S.

GENTLEMEN:—When taking into consideration the thorough and able manner in which the action of arsenious acid has been discussed during the past three meetings of this Association, I can readily believe that you would willingly excuse me from making any further remarks in connection with it.

Under these circumstances, my object in now addressing you is not to trespass upon your time and patience by a recapitulation of the points already touched upon, but to describe, as briefly as possible, a few experiments, instituted for the purpose of ascertaining whether anything could be learned of the action of arsenious acid on vital tissues with the aid of the microscope. In entering upon the investigation I had no preconceived opinion or theory to sustain, but merely desired to *observe* and *record* the phenomena presented.

Having made quite a free use of frogs during the last five years in vivisections and demonstrating the circulation of the blood in the capillaries, in illustration of my lectures on Anatomy and Physiology in the Dental College, it struck me that these animals offered a very convenient and ready means to experiment upon with arsenious acid, and that the results presented, be they what they might, would be quite if not entirely analogous to those induced when the same agent is brought in contact with the exposed pulp of a human tooth. As others may be desirous of observing for themselves the phenomena presented, it may not be amiss to describe the different stages of the operation, so that they may know how to proceed without assistance from any one.

In the first place, having obtained a medium-sized frog, select a piece of stiff pasteboard somewhat broader than the animal, and of sufficient length to admit of one or both the legs being drawn out to the full length, and then kept in position by tying down the toes. Knick the pasteboard on each side by cutting small V-shaped pieces from it, and also cut a V-shaped piece, as wide as the web between two of the frog's toes, from the end to which the foot is to be attached. Perforate each side of this space in three or four places, through which threads are to be passed to secure the foot. Then envelop the frog in a piece of muslin, so securely as to prevent any movement of the body, but allowing, however, one of the legs to protrude from the muslin. To secure the frog to the board, pass a piece of twine around the body of the animal and the board, and tie it tight enough to prevent the animal from slipping, but not sufficiently so as to interfere with the circulation of the blood. Then draw the foot to the place prepared for it, and secure it by passing threads through the holes in the pasteboard, and tying the toes of the frog down in such a manner as to stretch the web between two of the toes across the V-shaped space, and thus secure a clear and unobstructed view of the capillary circulation.

Having prepared a frog in the manner described, and placed the web of one foot in the field of the microscope, and found the circulation in the capillaries perfectly normal, I then placed a small quantity of arsenious acid, about one or two grains in weight, on the web, and watched the result through the microscope.

For the first half hour or so no apparent change was observable in the circulation; in a short time after this, however, the vessels sensibly increased in size and the circulation in rapidity of movement. The oval-shaped red corpuscles of the frog could be seen not only rushing through the vessels much more rapidly, but also in greater numbers than in the normal condition. This continued for some time, and then the rapid motion of the circulation gradually decreased, the blood corpuscles moving along slower and slower, and apparently clinging to the walls of the vessels, as if unwilling to leave them, and when doing so only yielding on account of the influence brought to bear by the *vis a tergo.* The circulation went on decreasing until eventually complete stagnation supervened. This condition was not confined to the immediate vicinity of the spot on which the arsenious acid was placed, but extended over the entire web.

The experiment was performed in the evening, and on looking at the animal the next morning I found that it was dead.

Desiring to ascertain whether a mere endermic application could be absorbed and carried by the circulation to the internal organs, the dead frog was carried to Dr. Buckingham in the course of a day or two, and the heart subjected to Reinsch's test.

In this test, the substance supposed to be impregnated with arsenious acid is first boiled in a fluid consisting of one-sixth pure hydrochloric acid and five-sixths water; after the boiling has continued for some time, a piece of pure and bright copper is placed in the boiling fluid, and if the metal acquires a dark hue under such circumstances, it is reasonable to infer the presence of arsenious acid. To make assurance doubly sure, however, the pieces of copper which have been changed in color are then put in a small glass tube, and if, on subjecting the tube to the heat of a spirit-lamp, a white metallic ring forms on the inner side of the tube, there can be little or no ground for questioning the fact that arsenious acid is present.

The most satisfactory evidence of the presence of arsenious acid in the frog's heart was obtained by this test, and the experiments afforded the most conclusive evidence that an application of this agent to the epidermis is liable to be rapidly absorbed, and carried by the general circulation to the internal organs.

On placing another frog in the same situation as the first, and applying the arsenious acid, similar results to those already described were obtained, so far as the web of the frog's foot was concerned; the animal, however, did not die, but in a few days the place where the remedy had been applied sloughed off, and left a large hole in the centre of the web. The animal continued in the apparent enjoyment of health for a week or two after this, at the end of which time, owing to the carelessness of a domestic, it escaped.

Not deeming it advisable to push my investigations any farther in this direction, as what had been done answered the end sought, this record is presented for the consideration of those who may feel an interest in such observations.

In conclusion, it may not be amiss to ask whether the increased size of the capillaries, and rapidity of movement in the circulation, the subsequent stagnation, and final sloughing of the portion of the web from the second frog, do not indicate that arsenious acid may properly be classified under the head of *irritant poisons*?

ALVEOLAR ABSCESS.

BY W. H. ATKINSON, M.D.

No abscess can form spontaneously in tissues that are healthy. Or, in other words, molecular degeneracy *must* precede all idiopathic formations of pus. Something very nearly allied to abscess may form in traumatic lesions, in which foreign bodies may be forced into the tissues, inducing an exudate that will encyst the foreign body and absorb the matters, if they be soluble in the exudate; if not, absorption will so reduce the size of the cyst as to inclose tightly the insoluble contents, desiccating them to the smallest dimensions, when nature establishes tolerance of the tumor if it be not too near some centre of motion, as a joint, origin, or insertion of a muscle, tendon, etc., or in too close proximity to some important nervous tract, gland, or other vital organ. And so we have spontaneous cure of this traumatically-induced abscess in the sound tissues of healthy molecules without rupture of its cyst. When molecular degeneracy has the dominion of the tissues, very slight exciting causes may set up the perverted nutrition which is the forerunner of abscess, producing, first, stasis in the circulation, then exudation of the degenerate blood-plasm, and tension of the weakened tissues, which now extends as far as the molecular life is low enough to allow of infiltration of the loose sacs of the cellular tissues, which will limit the future sac of the abscess. I have seen cases where more than half the body and limbs were inclosed in one continuous abscess or series of consecutive abscesses, immediately beneath the external fasciæ, burrowing around and beneath muscle, tendon, blood-vessels, and nerves, until the poor patient was literally one bag of illy-formed pus and broken-down adipose tissues between the deep and superficial layers of fasciæ.

Cases of what is popularly called "ague in the face" are closely allied to this sort of molecular degeneracy, but recently induced by excessive fatigue, bad feeding, or deficient food, or food of poor quality, cold, or excesses of indulgence in the venereal function, or depressing afflictions of the affections, in which the spirit is nearly crushed out of the body by abuse, unkindness, or neglect, by those who ought to comfort and sustain. Such cases are very apt to be tedious, and very harassing to patient and practitioner.

In all degeneracy our first duty is to correct, as far as possible, all the aberrant forces, and favoring the proper nutrient activity of the system, by establishing better regimen and morale.

The best possible practice is to change the molecular action by stimulating the capillaries, by the induction of sedation of the main trunks of the vascular system, through nausea, and making cold, warm, or hot applications (which ever are most comfortable to the sufferer) to the entire tumefied face. Then, if degeneracy of constitution be not too great, this will reduce the swelling and circumscribe the abscess to one or two points of suppuration, or prevent altogether the formation of pus. In case it localizes, accelerate the suppuration by a continuance of comforting poultices or baths until the abscess or abscesses point, at which time open and evacuate them, dressing, in these cases, with equal parts of pure creosote and tincture of iodine, morning and evening, for a few days, gradually extending the time between the dressings until the orifice weeps out, upon the removal of the dressing, a gelatinous fluid resembling the white of an egg, at which time cease dressing, but keep watch of the case, till completely sound, lest a relapse make it necessary to resort to renewed dressings. The best method of dressing is to roll up a pledget of cotton tightly on the point of a slim dressing-needle, smooth enough to permit it to slip off readily and remain in the wound, wet the very end with the creosote and iodine, and gently pass it to the very bottom of the sac, carefully withdrawing the dressing-needle without in the least displacing the pledget. In case you have miscalculated the depth of your orifice, carefully clip off the excess of cotton, projecting beyond the lips of the wound, and apply very nicely another pellet of cotton between the wound and the buccal walls, lips, or tongue, as the case may be, previously wet with a solution of tincture of arnica in water, one part of the former to four of the latter, and dismiss your patient until his next appointment.

Bits of cork, spunk, or soft wood make admirable substitutes for the cotton pellets, and have the advantage of not either shrinking or elongating.

New York, April 1, 1862.

ANAESTHESIA AND ANAESTHETICS.

BY J. S. LATIMER, D.D.S.

Read before the New York City Dental Association, March 5.

Æsthesia, from the Greek, signifies to feel, sensation, feeling. *Hyper*æsthesia signifies *exalted* sensibility, or feeling; while *an*æsthesia is understood to mean a deprivation of sensation.

Anæsthetics are agents which have the power of temporarily suspending sensation. Amylene, keroselene, carbonic acid, bi-sulphide of carbon, spirits of turpentine, ether, chloroform, and many other substances produce a suspension of sensation when their vapors are inhaled.

Local anæsthesia is induced by a variety of methods, including congelation, electricity, by pressure upon the part, and by the topical application of sedatives.

Insensibility to pain may also be induced by animal magnetism, hypnotism, and by compression of the carotid artery; but none of these are sufficiently useful to require more than a mere mention, except sulphuric ether and chloroform, and of these I propose briefly to speak.

"Humanity and science go hand in hand." Until the discovery of the anæsthetic properties of ether and chloroform, the dread of a painful operation and the shock the system received from it, contributed much to untoward results. Sympathy for suffering humanity made men feel out after a palliative.

In 1800, Sir Humphrey Davy suggested that nitrous oxide might be used in lessening the painfulness of surgical operations; but no use was made of it, for the very good reason that it is *not* an anæsthetic. To Drs. H. Wells, Charles T. Jackson, and W. T. G. Morton, the world owes eternal gratitude for the introduction of sulphuric ether, about the year 1844 or 1845.

Dr. Morton patented the discovery under the name of letheon. Subsequently Dr. Simpson, of Edinburgh, discovered the anæsthetic property of chloroform, and for some time this more powerful agent was the favorite, until fatal results were found to follow its administration.

With the aid of these beneficent agents, surgeons have been enabled to perform operations that otherwise would have been impossible, thus saving many valuable lives and rendering the severest operations comparatively terrorless.

Concerning the *modus operandi* of these agents much difference of opinion prevails, many insisting that their action is direct upon the nervous centres which they reach through the circulation, and that the agent is subsequently eliminated from the system, unchanged; while others suppose that they affect the brain by deoxidation of the blood supplied to the brain. These are only two of the several theories; but, of all, I deem the latter of these the more rational and the better supported by facts. It has long been known that anæsthesia can be produced by compressing the carotid arteries so as to temporarily deprive the brain of freshly-oxidized arterial blood. Dr. Bedford Brown, of North Carolina, in reporting a case of fracture of the cranium, says that the patient was put under the influence of a mixture of ether and chloroform, when he observed that the pulsations diminished, the cerebral surface became pale in color and receded within the skull, as if by collapse, and the hæmorrhage ceased. When, however, the influence of the anæsthetic began to subside, the surface of the brain became *florid*, and the pulsations and hæmorrhage reappeared with greatly increased vascularity.

Mr. Hilton, reporting the experiments of Mr. Durham with chloroform, says:—

"A dog having been chloroformed, a portion of bone, about as large as a sixpence, was removed from the parietal region of the skull by means of the trephine; the subjacent dura mater was cut away, and the surface of the brain exposed. As long as the animal continued under the influence of the chloroform, the smaller vessels of the pia mater were turgid with *dark-colored blood*, and the larger veins were considerably distended. *No difference in color between the arteries and veins could be recognized.* The exposed portion manifested a tendency to rise into the opening through the skull." The animal was then permitted to pass into a natural sleep, when the distention subsided and the brain assumed a paler hue; but when it was aroused, "*a blush seemed to start on the surface of the brain*, the vessels of the pia mater became fuller and fuller, and of a *bright arterial hue.*"

Here we have two cases which, though differing with respect to the *degree* of vascularity, yet point plainly to the fact that the blood sent to the brain during anæsthesia is deoxidized, by which we have a result identical with that produced by compression of the carotid artery. Oxidation of the nerve tissue seems to be essential to sensation and volition.

Concerning the comparative merits of chloroform and ether, it is conceded that the former is more portable, more palatable, produces less pulmonary irritation, is more certain and rapid in its action, and does not leave the house filled with a disagreeable vapor. These advantages are chiefly those of convenience.

As for the fatal results from the use of this agent, its friends aver that it is no more dangerous than riding in a railroad car.

Those who prefer ether aver that, notwithstanding it has been used longer than chloroform and has been administered by incompetent persons in many thousand cases, yet there is hardly a well-authenticated case of death from its use, in this country, recorded.

In a discussion before the New York Academy of Medicine, the general conclusion was arrived at that chloroform is far more dangerous than ether, though the latter is not entirely devoid of danger. The Imperial Society of Lyons arrived at about the same conclusion, and averred that anæsthesia is just as perfect with ether as with the more potent and dangerous agent.

The Boston Society for Medical Improvement have decided in favor of ether, as, also, have many other societies and eminent surgeons.

Dr. Charles T. Jackson accounts for the direct sedative and often toxical effect of chloroform in these words:—

"A mere chemical explanation of the action of anæsthetics is, that they all abstract oxygen from the blood, and hence reduce its stimulating powers on the nerves, and that some of them leave poisonous products, while those left by others are innocuous. Thus, as we have formerly stated, chloroform, or the ter-chloride of formyl, abstracts three equivalents of oxygen from the blood, but, at the same time, unfortunately, it deposits, in exchange for the oxygen, three equivalents of chlorine."

Concerning ether, he says: "Sulphuric ether, as it is improperly called, since it does not contain any sulphuric acid, is a pure hydro-carbon, with one equivalent of oxygen $= C_4 H_5O$. When decomposed by the action of the blood, it may be converted into aldehyde, acetic acid, and, lastly, into carbonic acid and water; no fixed product remaining in the blood, but all able to be removed by respiratory action. The odor of the breath of a patient who has been etherized shows that there are exhaled the oxidized products of the ether, and it is known by analysis that a much larger proportion of carbonic acid is exhaled from the lungs, during the etherized state, than in the normal condition of the system."

It is quite generally admitted that the exhibition of either of the anæsthetics under consideration should be avoided, if possible, in all cases of diseased heart or lungs, anæmia, and where there is a tendency to congestion of the brain or to syncope. It is believed by many, and not without some reason, that there are conditions, not yet well understood, which contraindicate the use of anæsthetics, and cases are recorded in which patients have, after the successful exhibition of chloroform several successive times, at last fallen victims.

Concerning the methods of administration, inhalers may be employed which, for chloroform, will admit plenty of fresh air, or they may be given simply on a napkin or a sponge.

A simple and efficacious method with chloroform, is to hold a single thickness of napkin over the nose and mouth, which may be kept saturated by dropping the chloroform on, drop by drop. Ether is administered on a funnel-shaped sponge, which is to be saturated with an ounce or two of ether; or a pasteboard or tin inhaler, made cone shaped, and having a saturated sponge in the open apex, may be used instead, as more economical of ether.

As many as eight ounces of ether have been timidly administered without getting the patient beyond the excited condition; whereas, had the agent been boldly and plentifully exhibited at first, hardly two ounces would have been required, and anæsthesia would have been certain.

A few hints concerning the materials and their administration may not be amiss.

Both ether and chloroform should be from reliable manufacturers, and should be kept well stopped, to prevent evaporation and deterioration by oxidation.

In all cases where dentists are called upon to administer either agent, a third party should be present, more particularly if the patient is a female. If it is proposed to push the administration to the loss of consciousness, for the removal of teeth, it is sometimes well to take the precaution to interpose a piece of cork between the jaws. The mind of the patient should be as calm as may be before the administration. The position of the body can generally be managed with the later styles of dental chairs, and if the too flushed face indicates a tendency to cerebral congestion, the patient may be given the upright posture; but if, on the contrary, the face becomes pallid, the horizontal posture will be safer. Anæsthesia may be conveniently divided into three stages: 1st, simple, cerebral excitement, or intoxication without loss of sensation; 2d, loss of sensation, but not of motion and apprehension; 3d, complete anæsthesia, with loss of all knowledge of external circumstances, of volition, and understanding.

With chloroform, the first stage is scarcely noticed, while with ether it is plainly marked. During this stage the pulse is sometimes considerably accelerated, the pupils remain unchanged, the muscular system more or less excited, and the movements irregular. Sedation commences with the second stage, in which the inspirations begin to be deeper and more regular; consciousness remains, but a rumbling sound is usually noticed in the head, and anæsthesia commences. The eyes are still open, and the patient able, though with some difficulty, to open the mouth or raise the hand.

From this the patient passes rapidly into the third stage, in which the eyes are closed, the breathing becomes deep and stertorous, volition is suspended, and the patient seems to dream.

For most dental operations requiring anæsthesia, the second stage is preferable, and this is especially true when chloroform is used.

It is well known that, during severe operations, considerable quantities of the vapor are required to sustain the proper degree of anæsthesia, and that the moment the operation ceases, the patient is liable to pass immediately into an undesirable stage, from the unimpeded effect of the agent; hence it is suggested that it is preferable to suspend the administration a few moments before the termination of the operation.

In order to prevent disasters, it is well that the surgeon be provided with restoratives.

It has been proposed to administer the nitrous oxide as a restorative, which, by supplying oxygen to the blood, will stimulate the nervous centres, and thus restore consciousness. Spirits ammonia, ice water, an electro-magnetic machine, and a tenaculum, should always be provided for exigencies.

On the 22d of February, 1862, Professor Jas. R. Wood, while operating on a patient under the influence of ether, at the Bellevue Hospital, found respiration had ceased. Recourse was at once had to electricity, artificial respiration, cold water dashed in the face, and stimulants internally, but some twenty or twenty-five minutes elapsed, my informant thought, before the least sign of returning life was noticed, and a considerably longer time before the restoration was sufficient to permit the completion of the operation.

Professor Wood confessed his inability to account for the untoward symptom, and said he had never seen ether bring his patient so near death before.

On the following Saturday, Dr. Elliott superintended the use of chloroform, at the same hospital, for amputation of the thigh.

Though the agent was cautiously and scientifically exhibited, the patient ceased to respire, when the doctor drew the tongue forward with a tenaculum, and thus permitted respiration to recommence, for the tongue had fallen upon and closed the glottis. The tongue may be seized with the hand or forceps, or any convenient instrument, and drawn forward; but the tenaculum is more efficacious, and the slight puncture it produces gives little inconvenience to the patient. Dr. Elliott remarked that patients frequently faint, the tongue falls, and respiration ceases; when, if necessary, he turns them upon their faces, and, lifting them bodily from the table, lets the head hang down, thus giving motion to the blood.

It is also recommended to slap the patient's face and chest with a wet towel. Fresh air should be let into the room, and artificial respiration by compression of the ribs, and then raising the arms, and forcing air into the lungs from the mouth of the assistant, continued until animation is restored or the patient beyond hope.

I might give some interesting histories of cases which have terminated in asphyxia, but this paper has already reached too great a length, and I must be content to give the general conclusions arrived at by their examination.

Neither ether nor chloroform is entirely safe in even the most experienced hands, though, so far as safety is concerned, ether is greatly preferable. The larger percentage of fatal cases have been in minor operations, such as the extraction of teeth. Patients who have inhaled chloroform two hundred times may die in the next attempt.

Lastly, I conclude that dentists are seldom justified in administering anæsthetics for the extraction of teeth.

EXPERIMENTS IN VULCANIZING RUBBER COMPOUNDS.

BY GEO. E. HAYES.

In view of the vast amount of material manufactured and sold for rubber work, I presume, ere this, you have come to regard anything tending to improve the quality, to facilitate the process, or to explain any of the anomalous phenomena which are sometimes met with, as of general interest to the profession. I send you, therefore, the result of a few experiments on the rubber compounds, which may not be entirely without interest.

From the very first, frequent complaints have been made of the rubber sometimes coming out porous or spongy, and much speculation has been indulged in as to the cause. Some laid it to the bad quality of the rubber, others to overheating in the packing process; others, again, to the wax not being properly removed from the mould; some, to vulcanizing under water; others, again, to vulcanizing without water, other than that contained in the plaster mould. Indeed, almost any change in apparatus, or in the manipulations which could be called to mind, has been made, at times, to bear the odium.

Some time since, having occasion to vulcanize a thicker piece than usual, the oven was heated, in fifteen minutes, up to 320°, and retained there the prescribed time. On removal, the mass was found to have swelled to double its original size, and was porous inside.

The experiment was repeated under water with precisely the same result. It was then tried in one of the old-style boilers, heated up to 320° in the same time, and retained there the time directed for that apparatus—again it came out porous.

Not content to give it up thus, three coils were made five-eighths of an inch in length, and the same in diameter. One was made from the Hard Rubber Company's gum, one from the amber base, and the third was from both; the centre portion being amber compound three-eighths of an inch in diameter inclosed in Rubber Company's gum, bringing the roll to five-eighths of an inch in thickness. The three pieces were vulcanized in one flask, the oven being heated up to 320° in fifteen minutes, and retained at that temperature forty minutes.

The amber was compact to its centre, and perfectly vulcanized. The combined coil was also compact, both portions having apparently received just the right degree of heat and length of exposure. The Company's gum was compact to the depth of one-eighth of an inch, the central portion being spongy. This seemed to indicate one good quality at least in the amber compound, but not having a sufficient supply to test it in other respects, my attention was directed to the possibility of obtaining a better result with the Company's compound, the good qualities of which, in most respects, seems well established. When the mode of hardening rubber was first introduced to the profession, it was very natural to suppose that the Company knew, and had adopted, the best mode of procedure. All the directions from that, or any other source, so far as they came to my notice, were to heat up—no matter how rapidly—to a certain degree on the scale, and retain that heat three hours, two and a half hours, or one hour, the directions having been changed from time to time in the latter respect.

I had discovered that equally good work could be produced in much less time than the shortest above mentioned, and by exposure to no greater heat, with a modified apparatus; but it had not occurred to me that the old mode of heating up might not be the very best possible. Resolved now to test this point, a coil of the Company's rubber, three-fourths of an inch long and the same in diameter, was imbedded in plaster as usual, and subjected to a heat which was judged would be just sufficient to retain the temperature at 320° if it had attained that degree. At the expiration of one hour the thermometer marked 210°. The flame was slightly increased. At the end of another hour it had reached 270°. Again the flame was raised very slightly, and at the expiration of the third hour it had just reached 320°. The heat was immediately removed, and the oven left to cool down to 212°, which it did in thirty minutes.

The coil was found perfectly compact, and a strip which had been put in as a test exhibited qualities which I had not before seen. It was almost malleable, could be bent with the pliers, indented with the hammer, retaining the shape given like a piece of lead, and yet it received the highest polish.

The experiment was then varied by heating up to 210° rapidly—say in ten minutes—then turning down the cut-off to the proper-sized flame, to carry up the heat to 320° in two hours, and was extinguished at once on that degree being reached.

The result was the same, the time being shortened nearly one-third in the first part of the process. In a subsequent trial, a piece one-half inch in diameter came out solid, it having been heated from 210° to 320° in one hour, and the burner extinguished immediately on attaining that degree. The highest perfection seems to be attained when the thermometer marks 320° without waiting for any continued exposure. It is light colored, compact, solid, and tough. A continued exposure darkens the tint, without any apparent benefit. The advantages gained by this modified process are threefold: First, a better quality of vulcanite; second, the ability to harden thick pieces; third, the tedious watching of the thermometer to retain the heat at any one given point is not required. A very few observations only are required to insure a good result. The time may be one hour, or three, or even five, in bringing up the heat to the given point, and as the increase is so gradual, a few minutes more or less in extinguishing the burner ceases to be material. In course of these experiments, one other point has attracted my attention which may be worthy of notice here. Almost every one has sometimes noticed a mottled appearance after polishing their vulcanite, black and tan. This has also been attributed to every conceivable cause.

On polishing the end section of many of the coils above mentioned, it was noticed that the two shades of color followed every layer of the coil, giving it the appearance of two strips of rubber rolled together, one dark, the other light. It was further observed that the light-colored side was invariably the one which had been covered with the cloth, and that those pieces which had been longest exposed on the top of the pile produced the darkest shade of color, while a sheet taken from the centre of the box was free from this peculiarity. It is generally supposed that the red color is given to the rubber by a mixture with it of vermilion, which is a sulphuret of mercury. Ethiops mineral is also a sulphuret of mercury, and very slight causes are sometimes sufficient to change one of these into the other, or vice versa.

It is well known that many of the compounds of mercury require to be excluded from the light to prevent a similar change of color. I throw out these suggestions as much for the benefit of those engaged in the manufacture of the rubber compounds, as to enlighten the profession on a dark subject.

BUFFALO, N. Y., April, 1862.

FRACTURE OF THE INFERIOR MAXILLA, AND ITS RESULTS.

BY S. P. MARTIN, M.D.

IN the February number of the DENTAL COSMOS, your correspondent from Norwich, N. Y., in describing a case of fracture of the inferior maxilla, and its results, fails to make the case sufficiently plain for a full and satisfactory understanding by some of your readers. He informs us that the patient had a tooth extracted (the right inferior dentes sapientiæ) about the second of July last; in the effort the tooth was broken off even with the alveolus, and, by a *subsequent* and "brutal effort" made with the turnkey, the roots were removed, and in the operation an extensive fracture occurred. Inflammation and suppuration soon followed; patient was unable to labor; was mostly confined to his room; discharged from half a pint to a pint of pus every twenty-four hours; became exceedingly feeble and reduced, etc. His attention was called to this case November 18, 1861. On examination, he found a large piece of bone separated from the jaw. To extract this piece of bone the next tooth was removed and an incision made above the margin of the jaw about two inches long; patient was improving for the next three days, up to November 21st, when he was taken with diphtheria or putrid throat; the swelling entirely disappeared from the face; discharge ceased, but the throat and neck became badly swollen, with intense pain and suffering. Patient died on the twenty-seventh.

Now what we desire to have more definitely stated, so as to give us a better understanding of the case, is an answer to the following question, viz.: How long a time intervened between breaking off the tooth and the subsequent operation with the turnkey? If they both took place on the same day, the case, to our minds, is a more remarkable one than if the jaw was fractured but two, three, or four weeks before Dr. Rhodes relieved him of his trouble, for in that case he must have discharged from his mouth no less than sixty to one hundred and twenty pints of pus during this period of more than four months and a half.

And further, we do not quite understand how an incision could have been made above the margin of the jaw two inches long. From the next tooth or second molar he must have passed the angle (nearly to which, he informs us, the fracture extended) inside the ramus, nearly to the tonsil or the soft palate. And as the diphtheria or putrid throat followed so soon after the operation, the question arose in our minds whether the inflammation of the throat and neck might not have had a traumatic origin, and developed with greater intensity by the depraved condition that his system had been reduced to by the formation and discharge of such quantities of pus.

New Braintree, Mass., March 16, 1862.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

Continued from page 545.

The second assertion, that arsenious acid enters into so strong a combination with tissues that it gives them the power of resisting putrefaction, must to all present be known to be a fallacy. What a desideratum it would be were we as dentists only required to apply an arsenical preparation to an exposed pulp and without the trouble of removing it plug over it, with the perfect assurance that no putrefactive process would go on! As I trust you have all of you removed fillings—I was going to say in which the above experiment had been tried, but I will not dignify such unworthy action by so inappropriate a term—in which the pulp has given the most unmistakable signs of putrefaction, it will therefore be unnecessary for me to say more on that subject.

The third proposition, that the compound of albumen and arsenious acid is not poisonous, I am at present unable positively to answer, but will state that a young kitten to whom was given some of the so-called arsenate of albumen, considers it so objectionable that she will not retain any portion on the stomach, but immediately vomits it up, also giving evidence of severe gastric inflammation. I shall try the experiment on another animal and report at the next meeting.

In conclusion, after presenting to you the above eminent authorities, I must again take you back to the first pages of this paper, believing as I do that the most clear and plausible theory is that advocated by our townsman, Dr. Geo. B. Wood: "It is not, therefore, by a chemical or corrosive influence that arsenic operates, but dynamically upon the vital properties. The part perishes because it is stimulated beyond its powers of life." This, gentlemen, I think alone can answer the phenomena of the destruction of the pulp, though I leave each one to form his own conclusions.

Dr. Kingsbury said, though not wishing to advocate or excuse the reprehensible practice of leaving the dead pulp in a tooth, yet considered some slight extenuation for such action might be offered from the fact that it was recommended in what was at one time rather a popular work among dentists, viz., The Anatomy, Physiology, and Pathology of the Human Teeth, by Paul B. Goddard, (Carey & Hart, 1844.) In his article on the treatment of an exposed pulp, he says: "The best plan is to clean out the cavity slightly, and apply to the pulp as closely as possible a very small quantity of pure arsenious acid. I say pure, because the common arsenic of the shops will not answer; and again, because many dentists are in the habit of mixing it with sulphate of morphia to diminish the pain, than which there cannot be a greater mistake, for the latter article both increases the pain and impedes the escharotic action of the arsenious acid. The arsenic thus applied not only destroys the vitality of the pulp but it combines with the animal matter of the pulp, and forms a compound incapable of putrefaction."

Dr. Peirce said, he had been experimenting as to the influence of a solution of arsenious acid on the germinating power of seeds. The two tumblers which he would present to notice had received an equal quantity of timothy and other grass seeds; they had both been placed in the same situation to receive light and heat. One tumbler was watered with a saturated solution of arsenious acid, and the other with pure water, or rather, the ordinary water of daily use in the city. The seeds in the last-named tumbler alone had sprouted and were growing luxuriantly; those contained in the other one at present give no evidence of vitality. He proposed to pursue the subject further, and would report his results at the next meeting.

Dr. Hayhurst referred to two or three cases which came under his notice, of unpleasant results from the use of arsenious acid on the teeth, in which the pulps were destroyed by that agent—the tooth in one instance being turned to a red color, though this result had not occurred in his own practice.

Dr. Flagg said his experience assured him that the reddening or suffusion of teeth was more frequently the result of other causes, than from the use of the arsenical paste — the result from the latter agent being rather the exception to the rule. It might, however, occur, if it was improperly introduced, as for instance, if a large quantity of arsenious acid is placed in a tooth, and a portion allowed to work out on the gum, inducing inflammation of the periodental membranes, suffusion of a tooth under such circumstances might readily occur.

Dr. Fitch said, from all he could learn, by consulting authorities, of the rationale of the effects of arsenious acid upon the living animal structure, he was carried to the conclusion, from the great conflict of opinions advanced, based upon experiment, etc., that there was very little known respecting it. Numerous instances were mentioned by different writers where as much as one ounce of arsenic was taken and no inflammation of the stomach ensued, resulting, however, in death. At other times six grains have been known to produce very extended and obstinate gastric inflammation; death supervening in a few hours. It appeared to him that there were conditions and circumstances governing and modifying its action, concerning which there was, as yet, very little known. Persons have been known to take half an ounce, and by prompt treatment recover; others having taken but a few grains, with equally prompt and energetic medication, paid the debt of nature after a few hours of extreme suffering. The brain at times is much disturbed under its action, and then it remained apparently entirely unaffected, even to the closing moments of life. Admitting that it is absorbed and taken into the circulation, and there can be no doubt of this fact, it becomes an interesting question to the student how its constitutional or remote effects are produced? What is its specific action upon the living fibre? Applied externally to an abraded or raw surface, violent gastric disease soon ensues. How does it exert its peculiar influence upon the mucous structure from topical application? In cases of poisoning with arsenious acid its presence has been detected in the blood, liver, urine, etc. It is eliminated from the system principally by the kidneys. As it is not a corrosive poison, it must act as an irritant, provoking congestion, inflammation, suppuration, or expend its peculiar virulence upon the sensory nerves, working its destructive tendencies through nerve substance. Small doses, or one-thirtieth of a grain, applied to the pulp of a tooth, seemed to act as an irritant, inducing death of this structure by subsequent inflammatory results. In his hands larger quantities destroyed the life of the pulp more expeditiously, preserving its substance from disintegration. Therefore used it generally in this way, applied freely to the tooth, allowing it to remain from twelve to twenty hours. If he could have his own way with those nerves that could be approached readily, he would extirpate them directly with the broach. This, no doubt, with some would be considered barbarous practice, yet with many patients it is attended with but very little suffering, and this momentary. Considered teeth, as a general thing, gave better subsequent satisfaction whose nerves had been removed with the broach than when destroyed with arsenious acid. He had his own views as it regards the direct effect of arsenious acid upon the living structure, believing it causes the death of the part by suspending molecular action, producing stasis. Had used it for sensitive dentine, yet was very careful about using it for this purpose on account of inducing periosteal difficulty.

Dr. Buckingham thought the reason why the pulp was not always destroyed when an application of the arsenical paste was applied, was owing to the insolubility of the arsenious acid in creosote. He had tried some experiments to test the solubility, and had found arsenious acid to be almost, if not entirely, insoluble in creosote; placing four grains of arsenious acid in a drachm of creosote and letting them stand forty-eight hours, then tested a few drops of the creosote taken off the top, by Reinsch's test, and obtained a very slight but a decided evidence of arsenic. Had also taken a drop of the creosote in which the arsenious acid had been mixed, and placed it on a piece of clean glass by the side of another drop of pure creosote and evaporated them in a moderate heat; the creosote in which the arsenic had been placed left a slightly white residue on the glass, the other evaporated entirely without leaving a stain of any kind. Whether this white deposit was arsenic or not he was not prepared to say, as he had not tested it. This experiment had been repeated a number of times in the space of three weeks, and had always left a residue from the creosote in which the arsenic was placed, and none from the other. These experiments seemed to show that arsenious acid, if soluble at all in creosote, was but very slightly so, and considered the small quantity he found in it might have been only suspended there, as creosote is of an oily nature, and the very fine particles would be suspended for a long time, and perhaps would not fall to the bottom at all. Most dentists with whom he had conversed made this paste by grinding the arsenic, morphia, and creosote together, using a large quantity of the creosote; it was then put into a bottle and allowed to settle. The arsenic being the heaviest article would fall to the bottom, the morphia deposited on top of it, and the creosote remain fluid. A piece of cotton on the point of an instrument passed down through these would first be wet by the creosote, then the morphia would adhere to it, and if forced down into the arsenious acid it is questionable whether it would take any of it up.

In reference to the combination of arsenic with albumen, he said he had assisted Dr. Barker to repeat the experiments mentioned in the doctor's paper; they had repeated these experiments in precisely the manner described, and had always found not only an evidence of arsenic in the substance, but the arsenic was in large quantities; the albumen was also soluble to some extent.

But had the compound—if we admit there is one formed—been insoluble in water, it would not prove that it is not poisonous. Many articles that are not soluble in water are rendered fluid by the secretions of the stomach. Take albumen as an example; when coagulated by heat it is insoluble in water; yet we all know a hard-boiled egg can be digested. If coagulated albumen was indigestible or not rendered fluid by the action of the stomach, cooking our meats and other articles of diet would be wrong. But we have abundant evidence that arsenic alone or arsenic in combinations is soluble in the fluids of the body. In what other way can we explain its effects on the mucous membrane of the alimentary canal when it has been applied externally? or how could it be found in the urine or bile in other secretions, when it has been taken into the stomach? It would be an invaluable benefit to dentists if it would form an indestructible compound with the pulps in teeth; all that would then be necessary for us to do would be to apply it to the pulp and fill a tooth without removing it. It would save us a vast deal of labor and our patients no inconsiderable pain.

By the unanimous desire of the Association, Dr. Edward Parrish was requested to present his views on this subject.

He said he believed arsenious acid wholly insoluble in creosote, also in all the essential oils. Creosote is an acid, the principal ingredient being carbolic acid. Solubility is, however, only an approximate term, as all substances are more or less soluble. Glass, and other articles, as referred to in Dr. Barker's paper, are soluble if very thoroughly powdered and acted upon by water charged with carbonic acid. The stain left upon the copper in Dr. Buckingham's experiment may have been due to certain impurities. He considered arsenious acid a true antiseptic, and though unacquainted with it as a dental agent, believed a dental pulp would not putrefy after being destroyed by it. In reference to the experiments of Dr. Barker, it does not follow that a true compound, and perhaps an insoluble one, may not be formed by the union of arsenious acid and albumen, as so much depends on the manner of conducting an experiment. Almost all experimenters are anxious that a certain result should be obtained; but to be valuable, it must be carried out in an entirely impartial philosophic spirit.

Dr. Barker replied that the basis for his experiments was taken from that of Dr. Muspratt himself, and he was only regretful that their results did not agree, as it would be a desideratum to the dental profession to have the insoluble, indestructible compound formed as claimed by Baron Liebig and his followers.

The subject was continued for the next meeting.

A MONTHLY meeting of the Association was held on the evening of May 13th, 1862, at eight o'clock.

President Buckingham in the Chair.

Present, Drs. Flagg, McQuillen, Kingsbury, Ellis, Peirce, Hayhurst, Fitch, and Barker.

The subject for discussion was stated to be

"THE USES OF ARSENIOUS ACID IN DENTISTRY,"

continued from last meeting.

Dr. Flagg said, before discussing the subject proper, he would ask the Association to allow him to make a personal explanation, in reply to a communication in the May number of the Dental Cosmos, 1862; said article being in response to remarks made by him in opening the discussion on arsenic, at the monthly meeting of the Association, in March, 1862, and therefore considered the floor of the Association the proper place to reply.

No objections being offered, he presented the following communication:—

In the May number of the Dental Cosmos a portion of an article from Dr. H. M. White contains disconnected quotations from remarks made by me at a meeting of the Pennsylvania Association of Dental Surgeons, while offering prefatory suggestions to the discussion on arsenic. Thus:

> "Another, at the same meeting, spoke of the deficiency which existed as to well-substantiated theories of its manner of accomplishing its purpose," "and differing decidedly from the opinion which had been advanced in the same number of that journal, as to the propriety of considering the thesis of Dr. J. D. White as satisfactorily answering the demand for information in this direction."
>
> "To this, it is sufficient to say, there is *no such opinion* advanced in the article referred to, as can readily be seen by reading it *slowly*."

To *this*, it is sufficient to say, there is *no such opinion* advanced in the remarks referred to, as can readily be seen by reading them *slowly*.

In the February number of the Dental Cosmos was presented an interesting, but to one desirous of information confusing, epitome of various authorities as to use, quantity, and effects of arsenious acid and its combinations, in its application to the dental pulp, for the purpose of effecting devitalization. The concluding paragraph of this article expressed the hope of obtaining "views in relation to the *use* of this agent at the present time."

The same number contains a "little scrap," as its author terms it, stating that in certain numbers of the *News Letter* "there is published a Thesis on the Treatment of the Dental Pulp, by Dr. J. D. White, which includes the *use* of arsenic;" and further states: "The doctrines advanced in the paper are still adhered to, and are, *no doubt, the best* that have been published on the subject."

This is certainly *an opinion*, and, considering that the doctrines were written almost twenty years ago, published ten years ago, and "are still adhered to," it seemed to me reasonable to infer that they were regarded as "satisfactorily answering the demand for information in this direction."

It was from this opinion that I dissented, and I desire at present briefly to state some of my reasons for so doing:—

1st. I believe that it is at present indisputable that a combination of arsenious acid, creosote, and a salt of morphia is the best form for exhibiting the acid for the purpose of devitalizing the dental pulp, but I do not admit the advantage of changing the acetate, which was suggested by Dr. Spooner, for the sulphate, which is adopted by Dr. White. There may be a very partial chemical combination of the ingredients of arsenical paste when properly mixed, but this is certainly *only* very slight. The test of this is that, if they are mixed no thicker than cream, a short space of time suffices for the difference in specific gravity of the various substances to effect an almost entire separation, the arsenic being the lowest layer, the morphia next, and the creosote upon the top, and this even though twice "three hours" be expended in the grinding of the arsenic and creosote.

The mixture, then, must be held as such mechanically, and for this purpose the specific gravity of the solids should approximate as nearly as practicable. In this respect the acetate is far preferable to the sulphate. If a relative bulk of arsenic is regarded as attained by using the sulphate, that result is as easily attainable by reducing the quantity of the acid if combined with the acetate. The application to a dental pulp is an endermic one, and the latest therapeutics teaches that the acetate is mostly used for endermic applications on account of its greater solubility.

2d. I cannot agree with *all* the views in relation to the results of the addition of creosote, for they are as follows:—

> "Now, creosote dissolves the arsenious acid more freely, perhaps, than any other essential oil; it is, therefore, in a favorable condition to unite speedily and in large quantity with the pulp, and in proportion to the rapidity with which it unites and destroys vitality will the pain be diminished."
>
> Again: "There is no difference in the rapidity with which it unites with the pulp, when the creosote only is combined with it."
>
> Again: "Prepared in this way, the arsenic is in a better condition to unite with the pulp than the mere dry powder of arsenic, on account of the creosote holding a large quantity of it in solution, and it becomes more minutely divided."

These "doctrines" seem to me to leave one more confused than even the perusal of Dr. Ellis's epitome, and yet they are pointed out as "no doubt the best."

In regard to this great solvent power of creosote, it is "sufficient to say" that half an ounce of the oil of creosote will not dissolve *any appreciable portion* of a half grain of arsenious acid, though it be thoroughly ground and shaken several times daily for several weeks!

3d. It is stated that "the morphia will exert its narcotic influence and lessen the pain, an effect which we cannot ascribe to creosote."

Pain is a pathological condition dependent upon irritation; arsenious acid is a vital irritant, and as such induces pain by its action upon living tissue. Creosote is easily demonstrated to be one of the best pain obtunders in the pharmacopœia. It is not necessary at this time to enter upon any theorizing as to *how* it acts; but if any one will mix one drop of creosote with one scruple of simple cerate, and apply it to a bruised, burned, or otherwise injured part, I think he would not be long in deciding as to which is the more correct—Dr. Brown, in asserting that "the effect of the creosote is to allay the pain, which the arsenic alone would produce when acting on the living nerve;" or Dr. White, in asserting that "the creosote cannot be regarded in any other light than a mere vehicle," which the conclusive experiment, already referred to, clearly proves it not to be.

4th. It is announced in the May number of the DENTAL COSMOS that *all* Dr. White *claims* "is, that he was the *first* to combine the ingredients of his formula *in the proportions* published, and *grinding* them together, forming a paste." For the "proportions," I would say that the difference is but *very slight* between Dr. Ide's three grains of arsenic to two grains of morphia and Dr. White's thirty grains of arsenic to twenty grains of morphia. And for the "grinding" process, I would say that it is unacceptable, from the following results: If a given quantity of arsenious acid, in the proportion called for by Dr. White's recipe, be ground in a mortar, with creosote q.s. to make the creamy consistency, for three hours, as directed in the DENTAL COSMOS of September, 1859, and afterward the morphia and remaining creosote be added, and all ground for half an hour, chemical tests will prove the existence of a certain amount of arsenious acid in every "pin's-head" sized portion, *if tested as soon as mixed;* and if the same quantity of arsenious acid is rubbed dry with a spatula upon a druggist's slab for ten minutes, and the morphia and creosote are then added, and all rubbed twenty minutes more, just as good tests are derived from the same sized portions.

Query.—If a certain result is obtainable in thirty minutes, what is the object of working three hours and a half to arrive at it?

5th. It is stated that the doctrines of the thesis are "still adhered to;" while we find that the statement, "a pledget of cotton about the size of a small pin's-head, steeped in the paste, is sufficient," is so far modified in the September number of the DENTAL COSMOS, referred to above, as to read: "Now moisten a pledget of raw cotton with the paste, about the size of a small pin's-head for a small tooth, and of a large pin's-head for a large tooth, and we will have about as near the quantity for use as we can describe." This difference may seem trivial, but certainly the original doctrines are not strictly adhered to in this instance; while the increase of hours as to duration of application irresistibly reminds one of Falstaff's men in buckram, for in the thesis it is stated, "the cavity may then be filled with cotton, and left in (?) from ten to twenty hours;" and in the September number of the DENTAL COSMOS we find, "as a general rule, we now let the paste remain for thirty-six or forty-eight hours." I have not deemed it important to ascertain the period at which the mutation from twenty to thirty-six hours took place.

I would not for a moment make any objections to such modifications in practice as may present themselves to the increasing knowledge of any intelligent practitioner, but in this instance, while experimental results incline me to regard *neither* of these as the "best doctrines," I must further declare that I do not yet see how BOTH *can* be received as the "best."

Trusting that the members present will pardon this deviation from the usual order of discussion, I would state that I have presented it here because I regard this as the proper place and time to define positions and correct misrepresentations, rather than occupy, in so doing, any portion of the *original department* of a journal, which dentists would fain see "devoted to the interests of the profession," rather than prostituted to the purposes of personal controversy.

Dr. Flagg then read a paper on Arsenic, presenting the results of experience and experiments with that agent. The paper will appear hereafter in this journal.

Considerable discussion, on points presented in the paper, took place, participated in by Drs. Fitch, Flagg, Kingsbury, Buckingham, and Barker.

Dr Peirce said, a few remarks made by a gentleman, on a previous evening, on the effects of arsenic on vegetable life, had led him to make some experiments, the result of which were as follows: that oats, wheat, and grass seeds would not germinate after having been soaked in a solution of arsenic and water—providing the water held in solution all of the arsenic of which it was capable, which is about one part in the thousand, while in a solution of a half, a fourth, or an eighth of the quantity of arsenic to the same amount of water as before, some of the seeds would germinate, though a large proportion of them remained unchanged—the time required for germination varying with the amount of arsenic and strength of solution. The method of making the experiment was to take six tumblers, in three of which was placed three ounces of pure water, in the other three the same amount of water, with one and a half grains of arsenic; in each of these some cotton was placed, on which was sown the oats, wheat, and grass seed; in a week, or little less, those in pure water commenced to germinate, while the others remained for two weeks or more without any appreciable change. He afterward took the glasses, and in each was placed the same amount of water, viz., three ounces—one was kept pure, in the others was placed an eighth, a fourth, a half, one grain, and one and a half grains of arsenic respectively—and, as before, placed in some cotton, and on that some grass seed. In four days' time the seed in the pure water commenced to germinate, while yet there was no change in that in which there was the smallest quantity of arsenic; two or three days later, in the glass containing the eighth of a grain, the seed was germinating, and still later we had the same result with those containing the fourth, the half, and one grain. In the latter but very few seeds germinated, while in the glass containing one and a half grains to the three ounces of water the seed remained without change, showing that as the quantity of arsenic was increased, the germination of the seed was delayed; also, that with the increase of arsenic we had the increase of the proportion of seed that failed to germinate.

The subject was continued for the next meeting.

GLEANINGS FROM PROCEEDINGS OF THE NEW YORK CITY DENTAL ASSOCIATION.

BY J. S. LATIMER, D.D.S.

Dr. B. W. Franklin, in a discussion of *mechanical dentistry*, said, we cannot be too exact in getting impressions. He uses three parts silex or spar with one of plaster, in casts, whether for vulcanite or metal work, for he thereby saves about one-fourth of the expansion.

As a test of good fit, he applies pressure all around on the alveolar ridge in the direction of the pressure upon the teeth in mastication. If any part of the ridge should be flabby, he would carve down the die slightly at that point.

He has found the expansion of a cast two inches from the centre of one "heel" to the centre of the other, to be twice the thickness of No. 28 gold plate.

Dr. Atkinson ignores air-chambers altogether, and, in case of hard centres and projecting ridges, he cuts away the centre entirely, leaving the plate shaped somewhat like a horseshoe. He believed the vulcanite nearly neck and neck with continuous gum and block work.

As an astringent application for sore gums, he uses one part tannin to two of glycerin, by weight.

Dr. J. Allen instructs his patients to sustain the posterior of their plates with the tongue, while biting on the front teeth.

He now uses an alloy of copper, tin, and antimony, resembling Babbit's metal, for dies.

In the case of projecting ridges, he holds the plate in place on the die with Burras's retainer, until with the mallet he has adapted it accurately to the ridge, after which he melts out the fusible metal die.

Dr. Franklin stated that plaster crystallizes in six-sided columns, which stand perpendicularly to the horizon; for which reason he believed the expansion would be less injurious if the impression should stand with the handle of the cup pointing to the zenith during crystallization. He asserted that zinc poured at the commencement of crystallization is more dense and tenacious than when poured at a higher temperature.

Dr. Atkinson finds the lips attenuated and contracted when the anterior teeth have been gone a few months. In such cases the lip will be made to appear stretched by the introduction of artificial teeth, but the proper expression is soon restored by the expansion of the lip which is certain to follow.

Dr. Latimer had been troubled by the displacement of the gum of the tooth in vulcanite partial cases, by the pressure employed in bringing the flask together. In cases where the gum of the tooth is designed to rest upon the natural gum, he carves away the cast slightly at that point. For this idea he was indebted to others.

Dr. Franklin thought gentlemen who had failed with plaster, had paid too little attention to the details of its manipulation.

In getting articulations, he preferred to see the teeth in the mouth before massing, as he could then get a better idea of the "expression," and could adapt the teeth to the face.

He thought he could distinguish temperaments by the teeth alone.

On the subject of *extracting teeth*, Dr. Franklin said some temperaments were incompatible with the calling of a dentist. He preferred the nervo-sanguine, and believed an operator with that temperament would give less pain than would be possible with another temperament. Patients, he said, are sometimes in mental conditions forbidding the extraction of teeth, the nervous system being so strained that even so simple and ordinarily harmless an operation as the removal of a tooth may be followed by serious consequences.

EDITORIAL.

AMERICAN DENTISTRY IN EUROPE.

The great success met with by some American dentists abroad has given a kind of pre-eminence to it throughout the civilized world. Of this, Americans may feel a degree of pride; but while in the practice of our art we have gained so much reputation, there has not been as much done, especially by those abroad, in scientific research as by Europeans. While periodical literature, and the education of dentists in regularly-constituted schools, is much older in this country than in Europe, there has not been as much attention paid to the careful consideration of the anatomy, history, and physiology of the teeth in this as in some other countries. It is not necessary to particularize, but when any authority is desired on any scientific subject connected with the teeth, recourse is generally had to European works. Perhaps, taking the dentists as a mass, they are better informed in this country than in any other, but from the facilities afforded for the general dissemination of knowledge by the publication of journals, and the institution of regularly-organized schools, especially in England, this will not long be true.

It is not at all surprising that Americans should succeed well in Europe, from the simple fact that in all the important cities there is so vast a multitude of American residents and travelers, that it gives not only employment, but a kind of distinction to them which attracts the attention of natives also; and being as well qualified as native dentists, of course they share alike the advantages of the most lucrative portion of the practice.

As far as we can learn, dentistry is better paid in money, in the aggregate, in this country than in any other under the sun; but in certain cases never can be paid as well. The nobility in other countries concentrating such vast wealth, make it a point to pay to professionals serving them in any personal want, and as a matter of distinction to themselves, what the middle classes cannot afford. This kind of distinction is observed to the lowest as well as to the highest grades of the professions. Under such circumstances it is not strange that young practitioners in this country should chafe to place themselves where they would at least enjoy the prospect of *patronage* which would give them a distinction in the world to which an even *tenor* in this country could never raise them.

There is a vast amount of quackery in our own country as well as in others, and it must not be taken for granted that the success our favored few have met with abroad is owing to the incompetency and ignorance of native dentists. Our own country furnishes a wider and more certain field for success and emolument than any other on the face of the earth. It is somewhat amusing to us that so many dentists, for years past, have called to consult us about the prospects of practice abroad simply because our pupil, Dr. Evans, has been so successful, instead of being contented to abide their time at home. Surely we could be of no more use to them than a *Japanese.* We take the liberty of making the following extract from a letter recently received from Dr. Evans, dated Paris, April 10th, 1862:—

"I have just returned from Russia, where I have operated for over *thirty-two* of the members of the Imperial family. The Emperor has made me commander of the Imperial Order—this high grade is rarely given to strangers in any profession. The Empress sent Mrs. Evans a superb necklace of diamonds, and an immense *pear-shaped pearl* of great value, also a handsome set of sable. I had many valuable presents, from each member something very beautiful."

In contrast, we will make an extract from a letter from another source, and another American dentist, dated Bockenheim, December 2d, 1861:—

"Dentistry, you are aware, is not only in the woods, in this country, but likely to remain so if not helped out by the Americans. Of course there are many causes for this which cannot be laid at the door of the dentist, as his hands have been tied by the authorities allowing him only one florin (forty cents) for filling. Poor encouragement, is it not, for a man to give more gold than he receives, say nothing of the time and labor required for good operations? The consequence is, they have been obliged to use a material to suit the fee, and that has been amalgam; but, dear me! what can you expect, when it is so common to see the *ass* and *cow* hitched side by side to a plow of the fourteenth century?"

J. D. W.

THE USE AND ABUSE OF WORDS.

Continued from page 550.

Horace long since asserted that "if matter be once got together, words will be found with very little difficulty." This position, which carries with it an air of plausibility calculated to win ready adoption on the part of those who have not made the subject one of careful consideration, is not strictly and philosophically true, however poetical it may be. If exactness and clearness of expression was a natural and necessary sequence to thought, it would follow that those who have the most knowledge must of necessity, and without effort, always express themselves clearly and fluently to others. And yet many essays and books can be produced in which original and correct ideas are rendered almost incomprehensible by an unfortunate arrangement of the matter, and the employment of ambiguous language. Often, indeed, it is unmistakably evident that the writer has made little or no effort to arrange his thoughts in the regular and dependant series in which, to secure a clear comprehension on the part of others, they should be placed, but has jotted them down in the confused and unconnected manner in which they have appeared to his mind, and thus are presented to the reader in a condition in which neither the beginning, the connection, nor the end can be discovered.

When the brain is in good working condition, and one thought produces another, and both ideas and expression present themselves at the first summons, and with such rapidity that it is impossible to record them fast enough to keep pace with the mind's action, it is no unpleasing employment to write; but such felicity of thought and expression the greatest genius does not always obtain, and ordinary writers know it only to such a degree as merely to credit its possibility.

Every one who has attempted to place his thoughts on record, can no doubt recall numerous instances in which a subject that appeared easy to elucidate when considered in the gross, has been attended in the execution by unexpected difficulties, and that the mind which seemed amply furnished with materials, finds, sometimes, an unexpected barrenness, and wonders whither all those thoughts and ideas have vanished which a little before seemed struggling for utterance.

The thoughts, as they appear, come in such a disjointed manner, and clothed in such ambiguous language that the writer, knowing that such a chaotic mass cannot convey to the minds of others an adequate conception of his meaning, is unwilling to let it pass from his hands in that condition; but, believing that what is worth doing at all is worth doing well, and recognizing that composition is a work of slow diligence and steady perseverance, works on with a dogged determination, condensing and simplifying the matter by removing all unmeaning and unnecessary phrases and epithets until he secures a clear and comprehensive description of his ideas.

The opportunities that have been afforded of examining the manuscripts of the best writers in all ages, and of every tongue, prove most conclusively, by their blurred and blotted condition, and the erasure not merely of single words, but line upon line, and page upon page, that their authors were not always favored with a command of language adequate to fully express their thoughts; and there is no doubt that the rearrangement of the matter, and the thorough pruning and sifting to which those productions were subjected, have contributed largely to their usefulness and perpetuity.

Buffon, who believed, and carried into practice in his own case, that the records of science should be made with the same attention to literary execution that is demanded in the other fields of letters, said that "Genius is Patience." Now, although these terms cannot be regarded with propriety as synonymous, there is little question that to the co-operation of these two powers the greatest discoveries and the best literary efforts are due. Genius must first discover the depths where the pearls lie hid before Patience brings them into the clear and full light of day. There are, it is true, *apparently* striking exceptions to this rule, but the records of science and literature furnish few such instances, and all we know of the works that have been marked by the seal of universal approbation sufficiently authorize the general position that nothing useful or durable has ever been produced with ease, and that *labor* is the parent of all the lasting works of the world.

Next to vagueness of description, there is no defect more objectionable in a writer than a *perpetual* and *unnecessary* obtrusion of self on the notice of readers. To make an occasional allusion may be allowable, and is sanctioned by custom and use, but to make such frequent reference to self as to be in violation of every feeling of delicacy and all rules of propriety, to say nothing of grammar, is highly reprehensible.

This defect, whenever exhibited in a marked degree, is unquestionably due to the fact that such persons are impressed with an overweening opinion of their importance in the universe, and have not yet discovered how insignificant, in comparison with the labors of the many, the efforts of any single man is. As almost all passions, however, have their good as well as their bad effects, so with regard to egotism; it may be observed, as a general thing, that no profession or science would have reached the excellence to which it is now advanced, had its votaries looked upon it with eyes of indifference and not valued themselves on performances for which many in the world could scarce be induced to esteem them.

Dr. Franklin, whose correctness of thought and purity of language commands universal admiration, and who, in the description of his many wonderful and valuable discoveries, makes the slightest possible allusion to self, has said that "most people dislike vanity in others whatever share they may have of it themselves; but I give it fair quarter whenever I meet with it, being persuaded that it is often productive of good to the possessor and to others who are within his sphere of action; and, therefore, in many cases it would not be absurd if a man were to thank God for his vanity, among the other comforts of life." Emerson, alluding to the same subject, remarks: "This goitre of egotism is so frequent among notable persons, that we must infer some strong necessity in nature which it subserves, such as we see in the sexual attraction. The preservation of the species was a point of such necessity that nature has secured it at all hazards, by immensely overloading the passion at the risk of perpetual crime and disease. So egotism has its root in the cardinal necessity by which each individual persists to be what he is."

The universality of egotism will be recognized when one recalls how much the general conversation of the world is made up of allusion to self. One person entertains those with whom he comes in contact by accounts of his discoveries, inventions, success in business or riches; while another claims sympathy by pathetic descriptions of his reverses in fortune or afflictions of mind and body; and so it goes *ad infinitum*, every one to a greater or less extent indulging in the practice.

In each particular instance the remarks are in accordance with the prevailing thought of the parties; and although some persons, by perpetually harping on one string and constantly obtruding their subject, whether foreign to the time and place or not, are frequently and with justice regarded as pests of society, there can be no doubt that the successful accomplishment of important discoveries or inventions, and the acquisition of knowledge or riches by such parties, is due to the concentration of thought and purpose which their remarks always evince.

While egotism thus may be, and is tolerated on account of being to a greater or less extent a universal failing, and at the same time in advancing the interests of the world rather beneficial in its effects than otherwise, writers should have the good sense, for reasons of policy, if they cannot be influenced by higher considerations, to model their expressions by the rules of politeness and not to be so prodigal of contempt for others and of esteem for self as to prove revolting to every intelligent, well-informed, and independent reader.

Perhaps there is no better method to modify such a practice than by extensive reading and a general and philosophical survey of the operations of the world, and thus find how small the influence of each individual, even the greatest, is; and how imperceptible the results of his endeavors are in comparison with the great whole. In the language of Dr. Johnson: "The business of life is carried on by a general co-operation, in which the part of any single man can be no more distinguished than the effect of a particular drop of rain, when the meadows are flooded by a summer shower; yet every drop increases the inundation and every hand adds to the happiness or misery of mankind." J. H. M'Q.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.

Management of Light.—Several years since, in a communication on the "Management of Light in the Performance of Dental Operations," we took occasion to present some practical suggestions on this subject, based upon personal experience. The following extract from a contemporary journal, on the same theme, but viewing it in other relations, is offered on account of the valuable suggestions advanced:—

"Very few give any attention to this subject until warned by evidences of the failure of eyesight. This warning is often practically too late. Light may be deficient, or may be excessive in quantity. The introduction of gas into our private houses has undoubtedly produced injury to the vision on account of its extreme brilliancy, but oftener far on account of its misapplication and mismanagement. The argand burner furnishes light of as good a quality, and a flame as steady, as can be procured in any way. If properly shaded and guarded, no better light need be desired. Several of our eminent jurists, who have much experience in night work, prefer sperm or wax candles. There is no doubt that great improvements will yet be introduced, so that the gas flame will be made to furnish a light more like the white light of day, and more steady. It must of necessity be concentrated, and for this reason be less excellent than daylight; besides, it lacks the chromatic constituents of the light which the sun supplies.

"When gas is used it should never be unshaded. The shade should be diaphanous; it should never be made of thick paper, or tin, or any opaque substance, nor should it ever be lined with a reflecting material.

"We have suggested a shade of 'blue barege,' or 'tissue,' which, being cut of the proper shape, can be readily drawn over the ordinary wire frame, which is sold in the shops, to sustain the common paper shade. This contrivance is employed and gives much satisfaction in several of our seminaries of learning.

"Looking at panoramas, fireworks, lightning, reading by the light of the moon or at twilight, the use of the telescope or the microscope, are all dangerous modes of employing the eyes. On this subject we might say much if space afforded. There are two methods of injuring the eye by the false direction of light, which we must pause to mention; that is, reading by a side light, or while laying in bed. The universality of the first habit has led to the frequent observation among oculists that the left eye is most apt to be diseased."

DENTAL REGISTER OF THE WEST—JANUARY.

The following extract is from an interesting paper of some length, on "*The Application of Chemistry to Dentistry*," read before the Indiana State Dental Association, by Chas. M. Wetherill, Ph. D., M.D., formerly of Philadelphia, but residing at present in Lafayette, Indiana.

"THE APPLICATION OF CHEMISTRY TO DENTISTRY. — Baron von Reichenbach, a distinguished chemist, has, in his declining years, directed a wish to chemists, which will be found on the two hundred and forty-ninth page of the seventy-seventh volume of the *Journal der Practische Chemie.* It has so peculiar an interest attached to it, whatever may be thought of the value of its suggestions, that I may be pardoned in translating the greater part of it, giving, as much as is consistent with proper brevity, the baron's own words:—

"'Many of our distinguished chemists present us daily with such excellent investigations, upon subjects so remote from our necessities, displaying thereby so much industry and acumen, that it often happens that one must deplore that so much talent passes by subjects lying much nearer to us, and of which the accurate investigation frequently belongs to the most pressing needs of mankind. * * * Such a subject is the detested enemy which attacks our teeth, springing from well concealed ambushes and laying waste the power of nutrition, as well as corporeal beauty. I allude to the so-called *caries of the teeth.* Few persons are so happy as to be free from it; and all are acquainted with this sorrow, which reaches the youngest as well as the oldest; which disfigures the noblest countenances; which renders mastication difficult or even impossible, and which defiles the breath. This affection, which still resists all the endeavors of the physician, has been placed within the domain of pathology, and is regarded as a disease of organic nature, being treated as a kind of bone ulceration or gangrene. It is even maintained that there are several varieties of the disease, but notwithstanding, therapeutics have not in the slightest prevailed against them. The disease has been regarded as a suffering derived from the general state of the constitution, and physicians have spoken of diet, fresh air, of baths and journeys, as good for its alleviation. Fifty years ago, I was acquainted with a blooming maiden, abounding in health and vital activity, whose two front teeth began to decay upon a small point of contact. The tooth powder of Hufeland, which contains Peruvian bark, was used industriously; but the evil constantly increased, and the young lady was very anxious and disturbed at the prospective loss of her front teeth. I recommended the use of charcoal powder, which at once arrested the decay. The lady died, in her forty-sixth year, after a long illness, and shortly before her death I saw the teeth in the same condition in which they had been left by the arrest of the caries in her eighteenth year. Charcoal powder seems, then, to be able to arrest caries; but it can only avail in favorable conditions of application, which are confined to the front teeth, and it is not always available even to these. To strike at the foundation of the evil, it is of imperative necessity to learn its nature. The dentists tell us but little of it, for they have fathomed it but little.

"'An instance occurred some time ago in Vienna, which throws a ray of light into this darkness. An actress, to replace a loss so disastrous to one of her profession, procured a set of artificial teeth made of walrus tusk. After using them for a few years, she complained to her dentist that the artificial teeth were beginning to be affected with decay. Incredible as it may appear, two teeth in contact were found to be affected with caries, exactly as in the case of living teeth! I have seen this set of teeth myself; Dr. Heider, a dentist of Vienna, preserves them as a curiosity. This example is of great value; for it teaches that caries is independent of the living organism, and cannot be a subject of pathology, but is one of chemistry, and that its source must be sought, not in vital activity, but in chemistry. In the mean time twoscore years have elapsed, and dentistry has made no use of this interesting discovery. The fact remains to-day as a curiosity, and no one has taken it as a point of departure for further investigation.

"'Not long ago I embraced the opportunity of the loss of some back teeth to examine their fragments. I found that the substance coating the cavities reacted acid to litmus; the deeper I penetrated the substance of the tooth the more acid was the reaction. At length the coating was entirely removed, and the bare, corroded tooth cavity displayed the acid reaction the strongest. From this it seemed that it was either an organic acid which dissolved the dentine immediately, or that the decay generated an acid; or at all events that the decay was developed under the influence of acid activity. The peculiar whitish coating with which the cavity was clothed cannot be a result of the food, for it bore no characteristics of putrefaction, but appeared to be a part of the tooth, or a residue of its solution, and was throughout penetrated by or exclusively saturated with acid.

"'In the seat of the affection, therefore, there resides an acid inimical to the chemical composition of the tooth. What kind of an acid is it; what are its properties; whence does it come, and how does it reach the inside of the tooth; how does it effect its injury?

"'First let us determine with what the tooth comes chiefly in contact. It is with air, with the carbonic acid of the breath, with saliva and food. Air and carbonic acid cannot injure it; it has been organized with a view to these gases. The same is true of saliva so far as it is of a normal character. But the food is of varied nature. It would have been interesting to have questioned the Viennese actress closely as to her mode of life and diet. The food which we enjoy is almost always more or less acid. All vegetables and vegetable matter, fruits, drinks, even ordinary water are somewhat acid, and if meats are not so, we eat with them so much salad, herbs, roots, and vegetable juices, that they become essentially as acid as the rest of our food. We also inhale carbonic acid with our breath, even if we except that which we exhale by the action of the acidifying oxygen upon the elements of the blood. In short, what constantly reaches our teeth is acid; alkaline food is never taken, for if there be alkaloids in some of our spices they are found there neutralized by their respective acids.

"'This much therefore is true, that our teeth remain under the constant influence of acids, and are, so to say, in a constant bath of acidulous juices. If then an acid is the means of the destruction of our teeth, it obtains full support through the whole course of our life, and never do we take in the mouth anything counteracting this acid activity.(?) I know of but one instance where this was done, viz., in the case of the lady to whom I recommended the use of charcoal tooth-powder. Hufeland's powder contains in its substance vegetable acids, but charcoal contains carbonate of potassa, and is in a condition to neutralize the acids which redden litmus. It is therefore probable that the maiden, by its employment, destroyed the acid decaying her teeth by neutralizing it. This was possible from the position of the decay, which was in front and readily accessible to the tooth-brush. In cases where the decay has attacked a molar, or where it is between the teeth, or has already excavated a deep cavity, neither charcoal powder nor the tooth-brush can reach it, nor can the small amount of carbonate of potassa contained in the charcoal act well upon the acid, especially through the deposit clothing the cavity. Soap has been recommended as a tooth-wash; if it is efficient, the acid in the tooth must have a stronger affinity for potassa than fatty acids in soap, which would, in such a case, be more efficient than charcoal powder.

"'By following the course of decay, it is apparent that caries cannot be putrefaction, because nothing ammoniacal is evolved; the affected spot has no bad odor, for the impure breath of persons with decayed teeth arises, not from the decay, but from the remains of food adhering to the cavities, and there decomposing.

"'The progress of the evil cannot be determined by the immediate contact of the food; because this contact is soon prevented by the deposit which covers the walls of the cavities. It is only liquids which can penetrate the deposit and reach the substance of the tooth. If the destroying acid proceeds directly from the food, we must, by chemical laws, assume that it neutralizes itself upon the wound, combining with the substance of the tooth Since the evil progresses uninterruptedly, we must assume that the acid is constantly presented to the wound by mastication, which presses the neutralized liquids from the cavities, filling them with fresh acid. * * * Filling the cavities with gold arrests the progress of the decay by preventing the contact of acid.

"'It is a question for investigation, whether the injurious acid be presented to the teeth ready made; or whether it be formed upon the seat of the decay by decomposition. At all events, the teeth cannot universally offer points of attack to it, else the decay would be general, and diffused through all the teeth. There must be peculiar conditions favorable to the action of the acid in certain parts of the teeth.

"'In the investigation of this subject it might be well to examine the conditions under which caries attacks the teeth of our domestic animals; to examine their food, and under what conditions it is taken. There must be veterinary experience upon this subject. Farmers declare that sheep lose their teeth when long fed upon hot mashes. I have long used a solution of carbonate of soda sharpened with a little caustic potassa, applying it with a tooth-brush after each meal, with the expectation of neutralizing whatever acid might remain in the mouth after eating. I soon fell upon a better way of applying the alkali, viz., by gently chewing a piece of sponge saturated with it. It was to be expected that by this means the acid would be more perfectly neutralized through the deposit coating the cavities of the teeth. I have lost no teeth since adopting this practice, and time will show whether it be efficient.

"'It follows from all that we cannot doubt the possibility of relieving the human family of a great amount of suffering arising from carious teeth, and that the case of the Viennese actress indicates the prospect of success; that the evil is not constitutional, but chemical; that it is a phenomenon of acid characters, and that it is within the immediate province of chemistry to throw light upon the subject.'

"Reichenbach concludes with an earnest appeal to chemists to take up the subject, saying that there can be no lack of substance upon which to operate for the examination of the acids when so many teeth are extracted annually by the dentists.

"It may be remarked as a novelty that the baron attributes the efficacy of charcoal powder to its alkali, and not, as generally assumed, to its antiseptic property.

"He does not allude to the solvent power of sugar upon the inorganic salts forming the basis of the teeth.

"It is strange that he (especially in the character of a German) should assert that alkaline substances never reach the teeth. Every tobacco smoker knows to the contrary, and may demonstrate it while smoking by the instant bluing of a piece of red litmus paper placed upon the tongue. Leaving out of consideration the excessive use of soda in baking, there is another source of alkali in the mouth, viz., the saliva, which is constantly more or less alkaline, except when in fasting, it becomes neutral and even sometimes acid. The alkalinity of the saliva increases during eating and immediately afterward.* Frerichs collected one hundred grammes of saliva while smoking, and found that it required fifteen centigrammes of sulphuric acid to neutralize the alkali which it contained.

"It is possible that the alkaline nature of saliva, especially after eating, was intended by the Creator to neutralize acids destructive to our teeth (which are composed chiefly of carbonate and phosphate of lime) which would arise from the food, and that the circumstances of civilized life have destroyed the balance existing between the acidity of the food, and the alkalinity of the saliva. Let it not be objected that in such a case Providence has shown its aversion to civilization, for brains have been given to us to use for obviating the difficulty by discovering means for the preservation of the teeth.

"If an alkali favors this preservation, the reputed freedom of the teeth of habitual smokers from serious decay, may be accounted for. As it is customary to use this luxury especially after eating, the alkali is thus presented when most needed. I attribute the preservation of my own teeth to smoking. When twenty-two years of age I had never used tobacco in any form; for a period of fifteen years I have not passed five days without smoking. My teeth at twenty-two were nearly all affected with caries.

"Dr. Neill,† of Philadelphia, who attended to them, filling every cavity with gold, informed me that the dentine was extremely hard and compact, and that I would retain the use of my teeth for a long time. I have never lost but one of the fillings which he placed, some of them in difficult positions, and I have often attributed my fortune in this respect to the good habit of smoking, a habit commenced on purely philosophical ground, and which has never been repented of.

"Reichenbach's appeal for the chemical investigation of caries cannot be urged upon the dental profession. But, nevertheless, the five thousand dentists of our country can aid in the investigation, and even determine the course which it shall pursue, if they will collect statistical information about caries.* It would not occupy much time for each practicing dentist to note down in a book, ruled for the purpose, answers to certain questions proposed to their patients respecting diet, mode of life, business, the time at which decay commenced, its rapidity, whether it be hereditary, etc. etc.

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* See many authorities in Gmelin.

† The printer employed by the *Register* has evidently made a mistake in spelling the above name, the gentleman alluded to being Dr. Danl. Neall, to whose well-known skill in introducing compact and thorough fillings, Dr. Wetherill is under far greater obligations for the permanency of the operations than to the tobacco he has consumed since they were inserted. J. H. M'Q.

"Such information collected by the dentists, and generalized, and simplified by the action of their societies and conventions, cannot fail to result in benefit to mankind."

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DENTAL REGISTER OF THE WEST—APRIL.

"NEW APPLICATIONS OF VULCANIZED RUBBER. By DR. J. RICHARDSON. —The facility with which unvulcanized rubber may be moulded into almost any conceivable form, and the indestructible nature of this substance when indurated, would seem to suggest at once its peculiar adaptation to the various necessities of the dentist. Within the past few years, it has come into very general use as a base for artificial teeth, and such has been its apparent fitness for the purpose, that perhaps four-fifths of the profession in this country have been induced to use it. It has been recommended and used in the construction of mechanical appliances for the correction of irregularities in the arrangement of the natural teeth, for which purpose it undoubtedly possesses many advantages. More recently, it has been employed to unite porcelain teeth to a metallic or swaged base. I regard the latter as one of the most important and useful applications of vulcanized rubber which has yet been suggested, and one which, when it is better and more generally understood, will in a great measure supersede the usual method of attaching the teeth to the plate by means of solder. Recently, I have extended its application to the following purposes, for which it seems well adapted:—

"HANDLES FOR PLUGGING INSTRUMENTS.—The only application I have made of the rubber for this purpose has been to small, pointed pluggers, formed from wire-handled excavators. The entire shaft of the instrument, with the exception of the polished portion next the point, is closely wrapped with a layer of rubber cut just wide enough to encircle it, adding a second and third in the same manner, or as many as may be necessary to give it the required thickness. Two layers, when vulcanized and dressed down with files to the octagonal form, (which I prefer,) will be large enough for small points. Any number of instruments being incased in this manner are imbedded in plaster and vulcanized. The temperature employed for this purpose, I think, does not materially draw the temper— at any rate, the heat necessary to re-temper need not affect the rubber which is at some distance from the point.

"Handles formed from this substance have a much more pleasant feel in the hand of the operator than uncovered steel, or even than ebony or ivory, and are not liable to the same objections which may be preferred to leather, since they do not absorb either the secretions of the mouth or moisture from the hands, and are, therefore, when polished, easily kept clean, not only in appearance but in fact.

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* See Kölliker's Mic. Anatomy, II. 54–123, for what is new upon the subject of the teeth, their literature, chemistry, caries, etc. Ficinus upon the loss and caries of the teeth by Walther, and Ammon's Journal of Surgery, etc. etc.

"Pivoting Teeth.—I propose, in all practicable cases, to substitute vulcanized rubber for wood in pivoting teeth as ordinarily practiced. Take small gold wire, (alloyed with platinum,) say about the dimensions of a medium-sized knitting-needle, or about one-third the diameter of the enlarged opening in the root, incase closely in a single layer of rubber, and vulcanize, but not so hard but that it shall possess some degree of flexibility, to admit of any necessary slight change in the direction of the pivot when permanently adjusting the crown. The relative advantages of the rubber pivot traversed with wire I think are obvious. It is wholly impervious to the fluids of the mouth—it will present greater resistance to the forces applied in mastication than either the crown or root, and will sustain the pivot-crown immovably in its place. Wood readily absorbs and becomes thoroughly saturated with the secretions, and it is chiefly from this source that the offensive odor so frequently associated with pivot teeth arises. Besides, wood being flexible, its fibres are soon broken up or detached by the mobility of the crown, whose base is seldom accurately fitted to the root, thus necessitating a frequent renewal of the pivot.

"*Wired Rubber Pivot, with Rubber interposed between the Crown and Root.*—The object of this method is to secure a faultless adaptation of the base of the crown to the filed extremity of the root, and by interposing one or two thicknesses of gold foil, to render the joint impervious to the fluids of the mouth. Having prepared the root in the ordinary manner, select and fit the pivot-crown to the vacuity, leaving something of a space posteriorly between the base of the crown and the root. Fit a wood pivot to the enlarged opening in the root, accurately, but in such a manner that it may be easily withdrawn—the end projecting from the root should be trimmed down to say half the diameter of the hole in the crown, so that when the latter is applied in the manner to be mentioned directly, some margin will be left, admitting of a proper adjustment of the crown when applied to the space. With the wood pivot in the root, fill the hole in the crown with stiffened wax, warm the pivot crown sufficiently to soften the wax, and apply it to the root in the desired position with respect to the other teeth. When the wax has hardened somewhat, withdraw the crown carefully on a line with the pivot, bringing the latter with it; then add sufficient softened wax to the base of the crown to fill in the gap or space between the crown and root; replace the tooth with the pivot attached, and press up until the crown again takes its proper position in the vacuity. By this means we get an *impression* of the filed extremity of the root, and at the same time secure an accurate relation of all the parts. The crown and pivot are then carefully removed. Now, take plaster and pour a small quantity on a piece of paper or card, and sink the pivot into it until the surface of the wax at the base of the crown rests upon the plaster, and then build the latter up upon the front part of the crown to the cutting edge, thus forming a shallow bed for its anterior face. When the plaster has hardened, warm the model to soften the wax, and then remove the crown and wax—the pivot will be found remaining in the model, but which, if previously oiled, can be readily drawn. We have now in the model an accurate representation of the end of the root, the size and direction of the fang canal, and when the crown is replaced in its shallow bed, also the space between the crown and root to be filled in with rubber. The hole in the model, corresponding with that in the root, should be enlarged somewhat, and this may be done with the same drill used in enlarging the orifice of the fang. After varnishing the hole in the model, pack in softened rubber until full, and insert into this the gold wire previously heated, one end projecting a line or so. Next fill the hole in the crown with rubber, heat the crown, and press it down upon the model and over the gold wire until the crown goes accurately into the depression made for it in the model. Then pack softened rubber into the space between the base of the crown and the model until it is filled in compactly. The whole is then incased in plaster, confined in a flask and vulcanized. If the foregoing manipulations are carefully conducted, the crown will go to its place in the mouth with unerring accuracy, and by placing one or two thicknesses of gold foil between the rubber and root, the joint will be rendered impervious. There is still an additional advantage in this method. All are aware of the liability of a wood pivot drawing from the crown where the latter is short and the hole in it shallow. The rubber pivot, vulcanized in the crown, I do not believe can be drawn from the shallowest cavity without fracturing the crown. I submitted this test to members of the Cincinnati Association, none of whom, holding the crown in the fingers, could withdraw the pivot with pliers, the hole being a fraction over a line in depth. I subsequently fixed the same tooth in a vice, and in drawing the pivot with pliers, fractured the crown in the attempt. In very many cases, this circumstance is of great value.

"*Canal of Fang lined with Rubber Tube for the reception of Gold Pivot Vulcanized into a Crown with a Rubber Base.*—The manner of forming a rubber tube for the fang is exceedingly simple. Draw a wire of gold alloyed with platinum, say half the ordinary diameter of enlarged opening in the root, and from two to three inches in length; incase this in a single lamina of thin tin leaf, to prevent the rubber from adhering to the wire, and which will enable the latter to be readily withdrawn after induration of the gum. Then wrap the wire tightly in a single layer of rubber, incase in plaster, and vulcanize; place the vulcanized tube in a vice, and withdraw the wire with pliers. Digest the tube in a solution of muriatic acid to remove tin. The same wire is used for pivot, and will enter the tube readily but accurately. Dress down a portion of the tube to fit the orifice in the fang, and force the tube up with wire incased, and then remove the latter, and file off the tube to the end of the root. The tube may be fixed more securely in the fang by smearing its surface with a little thin osteoplastic material before introducing. The crown being fitted to the space, and the gold pivot placed in the tube with a line or more projecting, the hole in the crown is filled with wax, and applied to the base of the crown, and the same manipulations practiced to secure an impression of the filed extremity of the root, as previously described. Remove the crown, with wire pivot attached, carefully from the mouth, and imbed in plaster precisely in the manner as before related. In this case, however, after the crown is removed from the model, the wire pivot is allowed to remain attached to the model, when the hole in the crown is filled with rubber, the latter softened with heat, and the crown forced back into its place upon the model, the projecting end of the wire pivot penetrating the rubber in the crown. The interspace is then packed as before, the whole incased, and vulcanized. In reapplying the tooth to the fang in the mouth, the pivot will be found to enter the tube too freely to give it the proper support—the latter may be secured either by flexing the pivot upon itself slightly, or by splitting it part away with a fine watch-spring saw, and spreading the ends apart, as recommended by Dr.

Dwinelle. By this method the patient will be enabled to remove the crown at will, for the purpose of cleansing the parts, though if the crown can be secured in such manner that there shall be no movement of it, or change of relation with the root, under any force that may be applied to it, (a practicable thing with this method,) and the joint can be rendered perfectly impervious, I generally prefer to make the crown stationary by fixing it immovably in the first instance.

"*Substitution of a Plate for a Pivot Tooth.*—Line the canal with rubber tube as before. Adjust a plate tooth to the space, and then solder on a gold backing. Place the wire pivot in the tube, with the end projecting. Hold the crown firmly to its position in the vacuity, and press softened wax or plaster around the end of the pivot and down upon the filed surface of the root and against the gold backing. Remove crown and pivot carefully, and imbed in plaster and sand; remove the wax or plaster, heat up and solder the pivot to the backing. Reapply to the mouth, press in softened wax posteriorly down upon the filed extremity of the root; remove carefully; imbed as before in plaster; remove wax, and pack softened rubber down upon the portion of the model representing the filed end of the root, around the pivot and against the gold backing, adding sufficient gum to enable you to dress it, when vulcanized, to the form of the adjoining natural organs. I have recently so pivoted a plate tooth in a case which required it, and I regard it in every particular as the most skillful and serviceable operation of the kind I have ever performed.

"IMPRESSION CUPS.—Take a plaster model obtained from an impression of the mouth, and fill out where necessary with fresh plaster, and trim to the desired form. The same may be obtained from a block of plaster, but it is more convenient to use a model, many of which, of various forms and sizes, collect in the shop, and from which suitable selections may be made. To the model fit accurately one or two thicknesses of impression rubber sheeting, and attach a strip of the proper width and length to its lower and anterior portion, to represent the handle. Portions of wax may be added wherever necessary, to give it as nearly as possible the form of an ordinary impression cup. The model, with the rubber covering attached, is then placed in the lower section of the flask, and treated in the same manner as when constructing an artificial denture in a base of rubber. The sections of the flask separated and the rubber removed, the matrix is packed with the vulcanite material, and vulcanized in the usual way. The cup is then finished on the inside with a scraper, and its exterior surface neatly dressed and polished. If it is desired to duplicate the same form of cup, the one so finished may be used to procure the matrix in plaster, it being readily and quickly accomplished. It will be readily perceived that almost any conceivable form of cup for ordinary or extraordinary cases may be easily made by any one who has facilities for vulcanizing, and thus the operator has the means of providing himself with a set which will fulfill his various wants in this respect more perfectly than the metallic cups in general use, and which vary more in size than in configuration. They make a very neat-looking instrument, and are easily kept clean. Their forms may be multiplied indefinitely, and there is no conformation of the jaw or teeth, or both, for which a suitable cup may not be made with this material in a few hours. For the want of a suitable cup in unusual cases, the operator is too often forced to content himself with an imperfect impression, and trust to trimming and guessing."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Influence of Habits in Modifying the Animal Organism. The following general observations upon this subject occur in the notice of a work "On the Unity of the Human Species," in the April number of the *Med. Critic and Psychological Jour.* for the current year: "M. Quatrefages, defining a variety as an individual or group of individuals proceeding from the same seminal origin, distinguished from the other members of the same species by exceptional characters, and a race as a number of similar individuals belonging to the same species, having received and transmitted by generation the characteristics of a primitive variety, proceeds to show the influence of the medium, or the circumstances, such as climate, government, social institutions, by which species are surrounded, in producing and developing such exceptional characteristics. He points to the ass, whose lineage is so certainly known, as an illustration of the results of physical agents, which is found ranging the west of Asia as the wild onagra, which is majestic in Persia, the size of a Newfoundland dog in the south of India, the depilated dwarf slave of our gipsies, and as shaggy as a goat in Poitou; he points to dogs, to the threadbare pigeon illustration, to the loss of hair by the ox, of feathers by the domestic fowl on being transported to meridional America; and then, indicating the part played by innate and hereditary tendencies in fixing and perpetuating at once a resemblance to and a difference from the parents, he enters upon the formation of animal races.

"The actual creation of the Durham and Dishley breeds of cattle by selection or breeding in and in, or what the French more truly designate the 'amelioration of the race through the family,' may serve as an example of the class of arguments upon this point. The history of the porcupine, or what we would prefer to call the pachydermatous, and the many-fingered families; the increased stature in the population in and around Potsdam, from the experiments of the giant-breeding Frederick of Prussia; the bronzing of the skin, and crisping of the hair of travelers in Abyssinia; and many similar facts are gathered into a proposition enunciating the deviations which may be effected within historic and brief periods, even under our own eyes, without affecting the integrity of the species, yet tending to establish distinctions.

"It has been long known to ethnologists, that the pyramidal skull, the broad and large configuration of the jaws, zygomata, and face generally, compared with the size of the brain, of the nomadic Turkish tribes inhabiting Central Asia, give place in the long-civilized European Turk to the oval skull and features characteristic of the settled and educated races with which they are brought into contact. But the most pregnant and piquant illustration is that selected by M. Quatrefages from the organic changes going on in the community of which his chief opponents are members. The African arrives in America a true negro. His first inslaved descendant presents softened lineaments; the face has ceased to be snout-like or muzzle-shaped; the head and body in each successive generation approach the form of the European, and intellectually, and in despite of all physical and moral obstacles, the purest Creoles rise in the scale. But evidence is given that retributively the slave-owner falls, and approaches his bondman. The physical change consists in increase of stature and enlargement of the orbits; a diminution of the adipose tissue, and of the whole glandular system. 'A few years have sufficed to establish a well-marked difference between the modern Americans and the English, of whom they are descendants; and apart from the European civilization which has followed them, we find some, after two centuries, with the facial angle, the fierceness, and the cunning of the Iroquois, others with the same exterior, the rudeness, the freedom, and independence of the Illinois and Cherokee,' etc."

"*Dentition, and the Etiology of the Affections of the Respiratory Organs, Ear, and Eye.* By A. Jacobi, M.D., Professor of Infantile Pathology and Therapeutics in the N. York Med. College.—After all my previous remarks on the nature and pathology of the mucous membrane in general, a few additional words will suffice to illustrate the relation of diseases of other organs to the protrusion of teeth. For the organs of digestion are not the only ones which are said to be influenced by, and to suffer from, dentition. Many diseases of the uropoietic, sexual, respiratory, and sensory organs have been attributed to the same cause.

"Diseases of the respiratory organs are very frequent in infantile age. The liability to catarrhal and inflammatory affections of the bronchi, etc. decreases, as a general rule, with the age; so much so, that their number during the time of dentition is decidedly less than before. This circumstance alone ought to render us careful in speaking of the protrusion of teeth as a cause of diseases of the respiratory organs of whatever character. The etiology in a given case is by no means unimportant; as the prognosis and even treatment depend a good deal on the causes of the affection. Among these the influences of weather, temperature, and seasons rank very high, as is well known; a number of epidemic diseases, as morbilli, hooping-cough, and scarlatina, exhibit, too, a great tendency to complications with catarrhal affections of the respiratory organs. These affections, however, appear frequently without peculiar danger, being the direct results of the state of the atmosphere, exhibiting an epidemic character. Many other diseases are liable to the same complications. Thus rhachitis, syphilis, scrofula, and tuberculosis, are among the principal causes of bronchial catarrh and pneumonia; inflammations of a croupous character engender in the neighboring organs the liability to catarrhal affections of the mucous membrane; and pseudo-membranous croup in the larynx is often combined with bronchitis and broncho-pneumonia; and even marasmus resulting from copious secretions or defective nutrition appears to give rise to severe and obstinate catarrh of the respiratory organs, by the inspissation of the blood and by the impediment to the normal circulation.

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"Whatever, then, I have cursorily stated on the causes and nature of catarrhal and inflammatory affections in this locality, shows that dentition is certainly not frequently to be blamed for their presence. I have here again, as in other instances, laid the most stress on the large number and variety of causes, in order to show that a differential diagnosis and exhaustive knowledge of general etiology will keep us from falling into the well-known errors and misconceptions universal in the public, and still frequent in the minds of professional men. Nor is there any connection between dentition and the treatment of the affections alluded to, with their fever, copious secretion, dyspnœa, and other symptoms. I do not see why a regular and strict diet, fresh and moist air, and uniform temperature required in the treatment of bronchial catarrh or pneumonia, should be considered as being in a direct relation to dentition; nor do I detect any between this physiological process and the febrifuges, veratria, digitalis, quinia, and antimony; or narcotics, as opium, hyoscyamus, and cannabis; or derivants, sinapisms, vesicatories, and local depletions; or expectorants of both mild and stimulant character, antimonials, ipecac., muriate, acetate, and sesqui-carbonate of ammonia, senega, camphor, benzoic acid, and others.

"The catarrhal affections of the eye, and the catarrhal otorrhœa, have already been alluded to. Their etiology, and therewith the possibility, or probability, of their dependence on dentition, have been spoken of on different occasions. I, therefore, leave you to the inferences naturally resulting from all my previous lectures. The only thing, however, to which I desire to direct your attention, is the occurrence of otorrhœa in all the periods of rapid cranial development, especially in such children who from bad habits, hot pillows and bonnets, or hereditary or acquired scrofulous disposition, are liable to accumulations of an over-amount of blood in the head. That in a time where the physiological development of the head closes sutures and fontanelles, raises teeth, and increases the amount of cerebral substance by a normal hyperæmia, otorrhœa should occasionally show itself, is no more wonderful than the fact clearly proven by every day's experience, that most cases will come on without serious symptoms of any kind, and gradually disappear spontaneously, no remedy having been resorted to besides cleanliness, and in some cases a gently astringent application. At all events you perceive how little there is in that 'teething through' or 'over' the chest, ears, or eyes."—(*Amer. Med. Times.*)

"*Development of the Dental Follicles and of the Teeth.*—MM. Robin and Magitot have published a work on this subject,* from which we extract a few of the most interesting observations. The ossification of the lower jaw is shown by the authors to proceed not from several points, but from one lamellar plate which gradually lengthens and thickens, and then folds over one of its edges to form the 'gouttière dentale,' from the bottom of which each dental germ or 'bulb' is separately formed before any partition between the follicles appears. The follicles are not formed till the dental trenches are complete. They begin to appear between the fifty-fifth and sixtieth days. The ordinary opinion is erroneous which supposes that the follicles once generated separate themselves from the mucous membrane, and sink pits for themselves in the jaw. On the contrary, the mucous membrane separates itself from the follicles, these retaining their relations with the vessels and the nerves. The follicles last developed have no relation with the mucous membrane until the period of eruption arrives. With regard to the structure of the enamel, the authors have completely established the fact that there are *no* blood-vessels in this tissue. Moreover, they have described a special layer of epithelium interposed between the external surface of the organ of the enamel and the inner wall of the follicle; this layer is not traversed by the capillaries of the wall of the follicles, and thus cuts off the enamel from vascular connections on this side. Nor does it receive any from the bulb, for its bulbar surface is separated from the bulb and the dentine by the thick layer of prismatic cells known as 'cells of the enamel.' The formation of the 'cement' or layer of true bone is accomplished in two ways. 1. By the portions of the follicle which have become alveolo-dental periosteum, and which are invested by the 'organ of the cement.' 2. In the portions of the follicles whither the cement organ does not reach, and in those follicles in which it does not exist, the cement produces itself on the surface of the root of the tooth, from base to point, in proportion as this root comes to occupy the follicle and push out the crown."—(*London Medical Review* and *Dublin Medical Press.*)

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* Now in course of publication in the Dental Cosmos.

"*The Physiognomy of the Syphilo-strumous or Syphilitic Diathesis.*—In leading characters it is very similar to that of the ordinary scrofulous constitution. The head is rarely well formed, the forehead being protuberant; the stature is stunted and belly large, muscles flabby, diseased joints not uncommon. The nose is sunk and flattened, the result, according to Mr. Hutchinson, (to whom the profession is much indebted for his careful and valuable researches into this question,) of snuffles or inflammation of the Sceniderian membrane in early life; and opacities of the cornea from early corneitis may be observed, as also scars of old fissures about the angle of the mouth. Occasionally, too, there are enlarged and hard cervical glands, but the upper lip is not thickened. The complexion is of a pale, earthy tint, contrasting strongly with the transparent tint of a strumous person of the sanguine temperament. The skin is sometimes thin and stretched, but is also dingy, coarse, and flabby, and shows scars or marks, the remains of former disease. It is uncomfortably dry, often with patches of psoriasis; the hair is also dry and thin, the eyelashes few, ill-developed, and broken; and the nails have the same character, being stumpy and brittle, and often ragged. The *teeth*, however, offer perhaps the most characteristic marks of the diathesis. Mr. Hutchinson has shown that, in many of these cases at least, the teeth of the second dentition are modified in development so as to be small and rounded or peg-shaped, instead of flat—the upper central incisors sometimes presenting a broad, shallow notch in their edge; this, however, is not distinguishable in the teeth of older persons, as the notch soon gets worn out, so that often at the age of twenty they are like ordinary teeth at sixty. This points to an imperfect development of the outer layer, and of the enamel. They are sometimes retrogressive in form, but not necessarily irregular in position or decayed; their color a dirty yellow.

"It is a question how far the administration of mercury in early childhood, or even to the parents during impregnation or growth of the ovum, affects the form and development of the teeth. I think I can confirm Mr. Hutchinson's diagnosis as to the mercurial teeth, which are often seamed across, jagged, yellow, and irregular in form, in persons who have taken mercury in infancy."—(*Dr. Thos. Laycock, Medical Times and Gazette.*)

"*On Certain Malformations of the Teeth in Congenital Syphilis.*—Two patients were in St. Bartholomew's Hospital whose teeth showed the peculiar malformation of the teeth described by Mr. Hutchinson as occurring in inherited syphilis. One of them, a girl aged seventeen or eighteen, had had repeated attacks of interstitial keratitis, a form of keratitis which occurs exclusively in congenital syphilis, not as a result of acquired syphilis. This patient had been in the hospital before for an attack of keratitis This was cured. She had recently been readmitted for contraction of the muscles of the knee. Another patient, a girl, was admitted for a relapse of keratitis. She had been subject to it from the age of seven. She had also a group of ulcers below the patella, which, in an older person, would no doubt be called tertiary syphilitic ulcers, and was subject to repeated attacks of inflammation about the joints. She had never had primary nor secondary syphilis. Mr Paget, therefore, suspected that she had inherited a syphilitic taint from her parents. On looking at the teeth the central upper incisors were found to be notched and narrowed at their cutting edges.

"This malformation of the teeth was not to be found in all cases of congenital syphilis; but when present it might, Mr. Paget believed, be considered positively certain that the patient was the subject of congenital syphilis. He said that he knew nothing more certain in medical practice. It was, he said, one of the most remarkable contributions to medical science for many years, and was as well settled as any fact in medical science, and we may be as sure as we are of anything, that persons with such teeth are the offspring of syphilitic parents.

"The temporary teeth, except that they are quickly cut and quickly lost, are not characteristic. Nothing can be drawn from them. It is to the central upper incisors of the permanent set that we must look for decisive characters. These teeth are smaller in proportion to the size of the jaw, and rather narrow, and also become gradually narrower toward their cutting edge. But the most remarkable thing is the crescent or half-moon notch in the cutting edge of the teeth. The borders of the notch are not broken, but singularly rounded off. The teeth are distinct, having wide interspaces. This notching of the teeth is rarely seen after thirty, as the edges of the notch are worn away so that the edges become worn straight. The other teeth were often affected, but not by themselves enough to render diagnosis at all certain. Mr. Paget then spoke of certain defects in teeth, which were often taken as characteristic, which had, however, none of the peculiar characters above described. They were like the typical teeth of syphilis in this only that they were not normal.

"In reference to treatment, the value of these tests of teeth was well shown. Thus, in a girl recently in Sitwell, for lupus of the nose and lip, except for the teeth there was nothing to suggest the idea of syphilitic taint. It looked just like a case in which arsenic would be prescribed. The teeth being, however, found to be characteristic, an anti-syphilitic treatment was adopted, and the girl was well in six weeks; a result, Mr. Paget said, quite impossible if any other treatment had been adopted.

"As to the cause of the peculiarity of the teeth, Mr. Paget said there are certain correlations of disease parallel with the correlations of growth which Dr. Darwin has illustrated, and, like them, usually quite inexplicable. Such are also the relations between certain diseases of the renal capsules and bronzings of the skin with dark pigment. It may be that they are related through some mutual influence on the blood, and in the method of complemental nutrition; but at present all that seems certain is that with some morbid conditions of the blood we find peculiarities of shape in certain organs or in the products of disease, as eruptive pigmentary deposits, ulcers, etc."—(*Med. Times and Gaz.*)

"*On Swallowing False Teeth.* By Weeden Cooke, M.R.C.S.—Permit me, through the medium of your widely-circulated journal, to repeat a warning, which has, I believe, on similar occasions been given to that very considerable section of the public who at once improve their masticating powers, and indulge a natural vanity, by wearing false teeth?

"In the middle of the night following Good Friday I was called by my friend, Mr. Elkins, to see a gentleman, who had gone to bed wearing some false teeth set in a plate of gold. At about two o'clock in the morning he awoke in great alarm, and found his teeth gone. There was some difficulty of breathing, great distress in swallowing, and he was greatly prostrated by fear of the consequences that might ensue. I found the pharynx extremely sensitive, but by perseverance I reached with my index finger one of the teeth, and ascertained that the whole plate was imbedded quite posteriorly to the epiglottis and larynx. Guided by my finger, I endeavored to dislodge the frightful intruder by means of my dressing forceps; but, although I could reach it, I could not get a sufficient hold to use the force which was necessary to bring it away. I, therefore, had to procure a much longer pair of curved forceps, and was thus enabled readily to seize the plate bodily and bring it away.

"It may well be conceived with what fervor the patient expressed his gratitude for the relief afforded him. The gold plate had various horrid-looking pointed claws for the purpose of hooking around the real teeth; very serviceable, no doubt, in the mouth, but provocative of desperate mischief when imbedded in the soft structures of the pharynx. There has been some inflammatory action, and considerable pain in swallowing; but the disturbance has, on the whole, perhaps been less than might have been anticipated.

"The moral to be drawn from this case, and others that have been recorded, is, of course,—Do not go to sleep with false teeth in your mouth. But I know a lady, who, by direction of her dentist, wears the teeth he has just provided her with *only at night*, as she can then go to sleep, and forget the pain they give her when worn in the daytime. *Verbum sapientiæ sufficet.*"—(*Lancet.*)

"*Odontological Society.*—At the meeting of this Society on the 7th ult., (Mr. Tomes in the Chair,) Mr. Coleman exhibited an upper incisor tooth removed from a patient the subject of inherited syphilis, and typical of that form of disease.

"Mr. Harrison read a letter from Mr. Bridgman, in reference to a paper read at the last meeting of the Society, 'On the Absorption and Formation of Bone and the Artificial Formation of Cartilage.'

"The President spoke in high terms of many of the views advanced by Mr. Bridgman.

"A paper, read at a former meeting of the Society, by Mr. Coleman, on 'Anæsthesia, considered especially in reference to Dental Surgery,' was then discussed.

"Mr. Sercombe said it was an important question, and one he should like to see decided by the meeting, whether the use of chloroform was or was not justifiable in dental operations. He believed it was, often in cases where only one or two teeth were to be removed. He did not agree with Dr. Kidd, who had stated that in dental operations the full effects of anæsthesia need not be induced.

"Mr. Catlin said he often adopted the plan of applying chloroform on cotton to the gums and palate; in this way the patient inhaled a small quantity without any dread of the effects of the agent, which he considered very important. He asked whether it were really correct that in the Crimea the French surgeons had administered it 25,000 times without a fatal result; and if so, had it generally been given in the open air?

"Dr. Kidd spoke in high terms of Mr. Coleman's paper. He quite agreed with him in his description of the different stages of chloroform, and with most of the views he had advanced. With regard to the rapidity of administration he somewhat differed from the author; he considered it desirable to get the stage of excitement quickly over, and thought anæsthesia might generally be induced with safety in about four minutes. He believed there had been one or more fatal cases in the Crimea; it had mostly been given there in the open air. He objected to inhalers with much metal about them; in cold weather it often prevented the chloroform evaporating freely, and interfered with the administration; he mostly used a paper cone with some lint inside it. He was quite of the opinion that anæsthesia might be induced while the sense of touch remained, and adduced several cases in illustration.

"Mr. Coleman, in reply to some of the remarks on his paper, said he did not agree with the view that getting quickly over the stage of excitement decreased the danger; the period certainly was shortened, but he thought the danger more than proportionally increased, and compared it to people running quickly over thin ice in preference to sliding gently over it. He was pleased to find that Dr. Kidd agreed with his description of the stages of anæsthesia, as it differed somewhat materially from those given by some high authorities on the subject."—(*Ibid.*)

"*Disinfection of the Breath.*—Various inquiries after tried recipes for that unpleasant affliction of a fetid breath, we hope will, to a great extent, be answered by the subjoined formulæ, collected by M. Chevallier, of Paris, and published in the last number of the *Journal of the Maryland College*:—

"These formulæ give as the principal and active ingredient chlorine in the mild form of hypochlorite of lime, about the action of which in the premises we need not say anything beyond that, while it seems specially suited to counteract the results of putrefaction in organized bodies, it does not remove their cause, and that wherever its use for the purpose given is indicated, other constitutional treatment becomes necessary, and in the case of decayed teeth there is a very ready relief, and which is a radical cure—that is, the removal of the tooth by an expert dentist.

"We would further remark, that since the hypochlorite is the only active portion of the recipes, that it should be fresh and good. This point in our trade is so often overlooked by its followers, that their attention cannot too often be called to this great secret in securing efficiency of their medicines, the satisfaction of the physician and patient, and with them success in business.

"Hypochlorite of lime should be dry, in the state of powder which balls between the fingers after standing in the air for a time, and it should exhale a strong odor resembling chlorine; in fact, should come up to the standard of the pharmacopœia. We dare say that there is a good deal more of it in the shops that does not, than there should be. Moisture does not so much unfit it for application, as the loss of odor which is due to certain changes in its elementary constitution involving the loss of its active power. Since these changes in part are owing or are called into play by the presence of organic matter, neither the form of pastilles nor the flavoring with essential oils appears eligible, unless with the restrictions mentioned by M. Chevallier.

"ALCOHOLIZED SOLUTION OF HYPOCHLORITE OF LIME.—Take of dry hypochlorite of lime, 3 drachms; distilled water, 2 ounces, (Troy.) Triturate the hypochlorite of lime in a glass mortar with a pestle of the same substance; when the hypochlorite has been thoroughly pulverized, add a portion of the distilled water; allow the mixture to rest until the liquid has become transparent; then decant; add a second portion of water, triturate and allow to rest, again decant; this process is repeated a third time. The three liquids which have been decanted are then mixed, and two ounces Troy of alcohol at 36°, and four drops of oil of roses, or some other essential oil, are added at the pleasure of the apothecary. The solution thus prepared may be employed to remove the fetid odor which is given off by the gums—an odor often due to the diseased condition of the tissues. To employ it, a half teaspoonful is poured into an ordinary tumbler of water, and the gums are washed with the mixture, employing for the purpose a sponge-brush. The same preparation may be employed to remove the odor of tobacco, rinsing the mouth several times with common water, to which has been added a teaspoonful of the liquid.

"Inasmuch as the odor of the essential oil is gradually diminished in time, said diminution taking place at the expense of the chlorine of the hypochlorite, it is suggested that this inconvenience may be obviated by preparing the solution with water and the hypochlorite of lime, and keeping it in one bottle, while the aromatic alcoholic solution (prepared of two ounces of alcohol at 36°, and four drops of essential oil) is preserved in another, both being well stoppered. When it is desired to use the liquids, a half teaspoonful of the chlorinated solution and a like quantity of the aromatic alcohol are poured into a glass of water, which is then employed as described.

"DR. ANGELOT'S PREPARATIONS.—The following preparation has been employed by Dr. Angelot, of Briançon, in the treatment of ulceration of the gums, a very frequent complaint with soldiers: Take of hypochlorite of lime, from 10 to 25 grains; mucilage of gum-arabic, 1½ to 4 drachms; syrup of orange-peel, 1½ to 2 drachms. Mix thoroughly. This mixture is employed as a lotion to the ulcerated gums.

"PASTILLES OF HYPOCHLORITE OF LIME.—Several formulas for the preparation of these pastilles have been successively published; these preparations have the advantage over those which are liquid of being more easily transported.

"*First Formula.*—Take of hypochlorite of lime, 7 drachms; sugar, flavored with vanilla, 3 drachms; gum-arabic, 5 drachms. The pastilles are made *secundum artem*, so as to weigh from 10 to 11 grains. Two or three of these pastilles are sufficient to remove from the breath the disagreeable odor produced by tobacco smoke. The pastilles thus prepared have a gray color, and become quite hard; if pastilles of whiter color are required, the following substances are employed:—

"*Second Formula.*—Take of dry hypochlorite of lime, 20 grains; pulverized sugar, 1 ounce; gum tragacanth, 16 grains. The hypochlorite of lime is triturated in a glass mortar, and a small quantity of water is poured upon it; it is then left to repose, decanted, and a second quantity of water added; the two liquids are filtered, and the gum and sugar added so as to form a paste. This is divided into pastilles, weighing from 12 to 16 grains. If it is desired to aromatize the paste, one or two drops of any essential oil may be added; the oil should be added to the sugar and gum before the paste is formed.

"DESCHAMPS'S PASTILLES.—Take of dry hypochlorite of lime, 2 drachms; sugar, 8½ ounces; starch, 8 drachms; gum tragacanth, 1 drachm; carmine, 2½ grains. The pastilles should be made so as to weigh about 2½ grains; five or six may be taken in the space of two hours. By employing starch in the preparation of the lozenges, Deschamps wishes to prevent the yellow color which they would otherwise assume.

"DESCHAMPS'S DENTIFRICE FOR REMOVING THE YELLOW COLOR FROM TEETH.—Take of dry hypochlorite of lime, ½ drachm; red coral, 2 drachms. Triturate well and mix thoroughly. This powder is employed in the following manner: a new brush is slightly moistened, then dipped in the powder, and applied to the teeth. According to the author, a few days use of this powder will produce a marked alteration in the appearance of the teeth, which will acquire a white color."—(*American Druggists' Circular.*)

Sympathetic Action.—"That reflex actions are, more than generally suspected, the source of disturbances in nutrition and in functions of the same nervous system, is now a truth proved by the researches of Dr. Brown-Séquard and other physiologists. The eye is precisely one of the organs that gives the most evidence and the most frequent examples of this kind of derangement. Surgeons are well aware of the facility with which inflammation and other diseases communicate from one to the other eye. Besides, Morgagni, Deval, Notta, and several others have recorded numerous instances of amaurosis from neuralgia. The coincidence of both diseases, the fact that the one yielded when the other was cured, or that section of the nerve between the place affected and the brain, abolishing reflex action, made also amaurosis disappear, convince that this latter could not be consequent but upon the morbid reflex influence exerted upon the optic nerve. Moreover, it is not only amaurosis which ensues on injury as well as on neuralgia of the trigeminal nerve. Notta observed twice a cataract produced in a healthy eye; one after a wound of the frontal nerve, and the other after neuralgia of the same nerve. Prof. Paul F. Eve, of Tennessee, U. S., suggested the idea of the extirpation of a carious tooth to Dr. H. F. Campbell, in a case of ophthalmia, and the operation having been performed, the patient was at once cured.* Yet the reflex influence upon the eye may start from distant organs; therefore, the stomach, the uterus, the kidneys, etc., may be often the origin of the disease. Amaurosis, deafness, aphonia have been immediately cured after expulsion of a tænia, and these, as the preceding facts, could not be otherwise considered than the reflex effect of the irritation upon the intestinal mucous membranes, or on the already mentioned organs. As in the beginning stated, the whole nervous system may be affected in a similar way; for paralysis, epilepsy, chorea, eclampsia, insanity, etc., may be seen as the result of such a morbid influence, likewise capable of determining the most remarkable changes in nutrition, as inflammation, gangrene, and other diseases of the skin, bones, etc."—(*M. Gonzalez Echeverria, Amer. Med. Times.*)

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* For this and other analogous cases proving the influence of reflex action on the production of many diseases, see Dr. Brown-Séquard's Lectures on the Physiology and Pathology of the Nervous Centres. Phila., 1860, p. 151 et seq.

"*Ulcers on the Tip of the Tongue.*—It often happens, according to Professor Roser, that children at their first dentition exhibit under the tip of the tongue, near the frænum, an ulceration of a white color, with an indurated base. The imaginations of anxious mothers cause them to believe that it is increasing, and may be attended with serious consequences. The medical attendant frequently prescribes lotions and other remedies which are quite ineffectual.

"This ulceration, hitherto undescribed, is a phenomenon belonging to dentition, and is produced by the pressure of the two first inferior incisor teeth on the under surface of the tongue, from a habit which many infants have under these circumstances, of forcing the tongue forward—a habit which always ceases when the other incisors have made their appearance. This ulceration is most frequent when the teeth are sharp and pointed, and disappears spontaneously, in no case requiring treatment."—(*Arch. der Heilk.* and *Dublin Medical Press.*)

"*The Expansion of Water not an Anomaly in the Solidification of Liquids.*—In most works on physics, reference is made to the dilatation of water when cooled down to near the freezing point, and to the beneficent effect of ice being thus caused to float, instead of sinking and choking up our rivers. The fact is also mentioned as a remarkable exception to the general law of expansion of liquids in proportion as they are heated. Thus, Arnott, in his Physics, designates it as 'a most extraordinary exception to the law of expansion by heat and contraction by cold,' producing unspeakable benefits in nature, etc.

"In Brande's Dictionary of Science it is said: 'In general, all liquids expand and contract in proportion as they are heated and cooled, but to this law there is a remarkable and anomalous exception in regard to water.'

"In Kemp's Phases of Matter, London, 1855, we are told: 'There is a most remarkable exception to this law of expansion in the case of water. Ice, as every one knows, swims upon water, and of course is lighter, that is to say, heat does not expand ice, but, on the contrary, contracts it. Whatever may be the cause, it is one of the most striking instances of design that can be witnessed in nature, and were it not for it, the globe would be scarcely habitable by man. Did water obey the usual law in this respect, it would fall to the bottom as fast as formed.'

"Considering the progress of science down to the close of the eighteenth century, and its still further advances to the present day, it is singular that this alleged anomaly should have been so long taken for granted and stereotyped in works on natural philosophy. It is many years since it was questioned by members of the Philadelphia Mechanics' Institute, because of its inconsistency with facts familiar to them. It was stated that it presented no 'remarkable,' 'peculiar,' 'curious,' 'extraordinary,' or 'anomalous' exception, nor any exception at all to any law, but was in strict accordance with the one that governs the solidification of liquids—that if ice did not float, the fact would be an anomaly.

"It was affirmed that if our lakes and rivers were fluid metals, with their surfaces congealed in winter, the solid portions would swim as ice swims; and the proofs offered were that pigs of lead and tin float in liquid lead and tin, and that the like takes place with gold and silver, zinc, copper, and iron, as may be daily witnessed in the factories. The inference seemed to be that most, if not all, solids are less dense than are their liquids at certain temperatures, and those who doubted this were asked to name a liquid, either vegetable, animal, mineral, or metallic, in which portions solidified do not swim. Wax, pitch, rosin, fat, sugar, sulphur, and other substances were named as affording no support of the common doctrine.

"In passing into the solid state, the molecules of every liquid assume an arrangement more or less peculiar to it, and, as this must take effect at some point of the decreasing temperature, it matters not where that point is as respects the common law of expansion. It no more affects that law than the journey of a traveler is affected by his stopping a moment to exchange a word with a friend. It neither affects his previous nor his subsequent progress—has, in fact, nothing to do with either.

"The temperature of solidification of course differs in different substances, and so does the effect. It is the molecular arrangement that diversifies the crystalline structures, and consequently the properties of solids; that gives to each a 'grain' and character peculiar to itself. In the soft metals, the crystalline texture would hardly be suspected, but it may be vividly brought out, even in lead, by crushing a mass just before solidification is completed. In iron foundries, the moment when the crystals are forming is often indicated by a rising of the metal in the gates of a mould.

"It is known that the crystalline structure of metals is deranged by rolling, stamping, forging, wire-drawing, and other processes, but it is not commonly known that this effect is temporary—that they have power within themselves to recover their pristine formation. This we have noticed in drawn wire and pipes of block tin. When of pure metal, they are soft almost as lead, and yield to flexure as silently; but if laid aside a few years, they give out, when bent, the crackling noise by which bars of the metal are characterized."—(*Franklin Inst. Jour.* and *Annual of Scientific Discovery.*)

The Science and Art of Metallurgy.—In the course of a bibliographical notice of a work "On the Art of Extracting Metals from their Ores and Adapting them to Various Purposes of Manufactures," by Dr. JOHN PERCY, a writer in the *Westminster Review* makes the following pertinent remarks upon the necessity and value of a competent knowledge of science and its practical application in the development of art:—

"In any attempt to improve our processes, it is of the utmost importance to know alike what others have *succeeded* in doing, and also what they have *failed* in doing; since it is not at all uncommon for patents to be taken out for supposed improvements which have been in use in particular works for scores of years; while, on the other hand, it not unfrequently happens that thousands and tens of thousands of pounds are spent in fruitless experiments, which a knowledge of antecedent failures of the same kind would have prevented. It is the office of science, says Bacon, 'to shorten the long turnings and windings of experience;' and to no department of art is it more important that the highest scientific skill should be applied. That science should not *at present* be able to predict results with sufficient certainty to govern the operations of the metallurgist only shows that the necessary investigations have not been carried sufficiently far; since it is impossible to believe that the questions which remain to be solved are really beyond the reach of competent skill. We shall offer to our readers a few illustrations of what science has done in these matters, and of what still remains for it to do.

"Some years ago, it was the practice of tin-plate works to throw away a large quantity of black dust formed in the manufacture. In conjunction with the late Mr. Henry, Dr. Percy visited tin-plate works in South Wales, and procured specimens of this dust, which it had been the former custom to throw into the river hard by, and in which Mr. Henry found 60 per cent. of tin! Many copper ores contain considerable quantities of gold and silver, which it has not been considered worth while to separate. At some large chemical works, in which sulphate of copper was prepared by dissolving copper in sulphuric acid, an insoluble residue was produced in the process, which had been put aside from time to time, and had fortunately not been thrown away. A small sum was offered by certain persons for this residue; and suspicion having been excited by the quarter from which the offer proceeded, it was declined, and the residue was examined, with the result of finding it to contain £700 worth of gold! It is believed by Dr. Percy, that the slags which have been cast out from the furnaces used for the remelting of old copper and the refining of new, in the Government establishments for the preparation of copper sheathing for ships' bottoms, contain a large amount of the precious metals. There are probably (he states) accumulations of copper slags in some of Her Majesty's dockyards, or in their vicinity, which present a more promising field for mining enterprise than many a *sett* in Cornwall or Devon."

"*A New Silver Alloy.*—M. DE RUOLZ and DE FONTENAY, of France, have lately obtained, after several years' experiments, a new alloy, which may be very useful for small coin and for many industrial uses. It is composed of one-third silver, twenty-five to thirty per cent. of nickel, and from thirty-seven to fifty per cent. of copper. Its inventors propose to call it *tiers argent* or tri-silver. Its preparation is said to be a triumph of metallurgical science. The three metals, when simply melted together, form a compound which is not homogeneous; and, to make the compound perfect, its inventors have been compelled to use phosphorus and certain solvents which they have not yet specified. The alloy thus obtained is at first very brittle; it cannot be hammered or drawn, and lacks those properties which are essential in malleable metals. But after the phosphorus is eliminated, the alloy perfectly resembles a simple metal, and possesses, in a very high degree, the qualities to which the precious metals owe their superiority. In color it resembles platinum, and is susceptible of a very high polish. It possesses extreme hardness and tenacity. It is ductile, malleable, very easily fused, emits when struck a beautiful sound, is not affected by exposure to the atmosphere, or to any but the most powerful reagents. It is without odor. Its specific gravity is a little less than that of silver. An alloy possessing these properties must be very useful to gold and silver smiths. It can be supplied at a price forty per cent. less than silver, and its greater hardness will give it a marked superiority. It may also serve as a substitute for gold-plated or silver-plated articles, which are now so common on account of their cheapness, but which will not bear replating more than a few times, and which are, in the long run, sometimes more expensive than the pure metal. The new alloy, however, will be most useful for small coin. Its preparation and coinage are so difficult that the coin made of it cannot easily be counterfeited. Its hardness would render it more durable than silver; and thus the expense of recoining, and the heavy loss arising from the wearing of our silver coinage, would be greatly diminished."—(*London Chemical News* and *Annual of Scientific Discovery.*)

A New Alloy.—An exchange says: "An alloy, as a substitute for silver, is proposed by M. Trabuc, of Nismes; it consists of banca tin, 375 parts; nickel, 55; regulus of antimony, 50; bismuth, 20. One-third of the tin is placed at the bottom of a crucible of suitable dimensions, together with the nickel, antimony, and bismuth; upon this first layer a second third of the tin is deposited and covered with charcoal to the depth of 1½ inches; the crucible being covered up, it is heated to a white heat, then with the aid of an iron rod, also heated, we ascertain if the nickel be melted and the antimony be reduced, in that case the remaining portion of tin is passed through the charcoal, and the whole stirred until a perfect mixture of the different metals is obtained; it is then cast into ingots or other forms. The color of this alloy is silver white, and it resists the aetion of vinegar and other vegetable acids."

"*Description of a New Fusible Alloy.* By B. WOOD, M.D.—In this Journal for September, 1860, will be found a notice of the cadmium alloy discovered by me, consisting of from one to two parts of cadmium, two parts of tin, four parts of lead, and from seven to eight parts of bismuth, and so exceedingly fusible as to melt below the temperature of 160° Fahr. A brief description of another alloy similar in character and scarcely less remarkable, is herewith submitted. It consists of—

Cadmium, 1 part; lead, 6 parts; bismuth, 7 parts.

"This alloy melts at about 180° Fahr., being nearly midway between the melting point of the old fusible metal consisting of the *three* metals, tin, lead, and bismuth, and that of the alloy first mentioned, consisting of the *four* metals, cadmium, tin, lead, and bismuth. It is remarkable as exhibiting the liquidifying property of cadmium in certain combinations; also, in the fact that, while the mean melting point of the constituents composing it is much higher than that of those composing the old fusible metals, it melts at a much lower temperature—being more fusible than any other *alloy* yet known consisting of but *three* metals.

"It has a clear, brilliant metallic lustre, that does not readily tarnish. Its color is a bright bluish gray, resembling platinum; when cast, its free surface presents a white, frosted appearance. It is very flexible in thin plates, and breaks with a hackly fracture; but when thicker bars are broken, the fracture is smooth, resembling that of tempered steel. It is malleable, but not perfectly so. In hardness it is about the same as bismuth, and about the same as an alloy of two parts of lead and one part of tin, or 'coarse solder,' which it resembles more nearly in other respects.

"It may be that more approved methods of measuring temperature will give the alloy a still lower melting point than above ascribed to it, as I see that the experiments made by Lipowitz with my 'fusible metal' indicate for it a much greater fusibility than my measurements."—(*Amer. Jour. Science and Arts*, March, 1862.)

"*Paraffine.*—Most bituminous substances, when treated by distillation and other refining processes, yield a beautiful white substance, resembling sperm, called paraffine, which name it has received on account of its inert character when brought into contact with a great number of corrosive agents. Sulphuric acid, which converts wax and spermaceti into a blackened mass, has no effect upon it at ordinary temperatures; and nitric acid, which oxidizes nearly all organic bodies with great rapidity, exerts no action upon paraffine except at very elevated temperatures. The strong alkalies—potash and soda—which convert oils and fats into soap, do not exert such action upon paraffine. It is as white as the purest bleached wax, and it makes candles of great illuminating power. It is obtained in the greatest quantities from the oils of distilled cannel coal. The paraffine oil is the heaviest which passes over from a still in the distillation of coal tars—its specific gravity ranging from ·900 to ·930. It is placed in a vat and cooled down with ice or other refrigerating agents, when it crystallizes in large scales. It is then lifted and strained, placed in bags, and submitted cold to severe pressure. It is then remelted and treated with half its weight of strong sulphuric acid, at a temperature of 356° Fahr. The acid removes any impurities, consisting of bitumen, that may be in it, after which it is washed with water, run into cakes, and pressed again, while warm, in a hydraulic press. It is again melted and treated with caustic potash in solution (some use alcohol) to remove any resinous matter that may be left, after which it becomes as clear as water before solidification. It is now admitted that there are several varieties of paraffine, but there is little to distinguish them excepting their melting points, which range from 113° up to 139° Fahr. Aniline colors impart to paraffine candles most beautiful red, purple, and violet tints."—(*Scientific American.*)

"*Monstrous Birth. 'Parasitus pentadymous encranius.'*—A most extraordinary and altogether unique case of monstrous birth has been communicated to the Royal Medical Society of Athens by Dr. Aretæos. A young woman, aged twenty-two, gave birth in the seventh month of her first pregnancy to a fœtus which was fully developed for its time, but whose head was of the size of that of a hydrocephalic fœtus, and whose skull was open at the top along the course of the sagittal suture. A second fœtus (the first in order of birth) was only two and a half inches long, without a head, and with rudimentary extremities; *it could easily be placed in the cranial cavity of the larger fœtus.* On opening the latter more thoroughly, a third fœtus was discovered, *attached to the medulla oblongata of the fully-developed fœtus.* It was almost three inches long, and neither in it nor in the second fœtus was there any trace of more than three tissues, viz., connective tissue, (which formed the great bulk,) fragments of bone, and fragments of cartilage. In a serous sac, which arose partly from the arachnoid of the parent fœtus and partly from the body of the third fœtus, there was discovered an oval body, which, on examination, was found to inclose a considerable sized table-shaped piece of bone, and was adjudged to represent a fourth fœtus. Besides this, a small fleshy mass was removed from the skull of the 'parent fœtus,' and on section this proved to contain what appeared to be certainly a tooth; and it was, therefore, decided that this represented a fifth fœtus. According to the theory of Dr. Aretæos, there must originally have been one ovum including four others, and the act of conception must have impregnated them all, and caused them to begin to develop. But as the four parasitic fœtuses got pushed off to the anterior end of the spinal cord of the parent fœtus and included in its cranial cavity, their development was arrested, and in turn, the skull of the parent fœtus was prevented from closing, and assumed a bulged appearance."—(*Virchow's Archiv* and *Dublin Med. Press.*)

Supposed Poisonous Action of Nitric Acid Fumes.—"The exact influence of fumes of nitric acid on human life is not known. The following example is hence suggestive of questions of interest: Two men, employed in a manufactory of chemical products at St. Denis, were found dead in the street a short time after they had quitted their employment. A medical man declared that death had been occasioned by their having been too long exposed to the fumes of nitric acid. The bodies were taken to the Morgue to undergo further examination."

MISCELLANY.

In one of his admirable lectures "On the Physiognomical Diagnosis of Disease," in the *Med. Times and Gaz.*, DR. THOS. LAYCOCK makes the following remarks upon some of the diathetic relations of the teeth: "The *teeth* in the scrofulous diathesis present the signs of imperfect nutrition and development, but these vary much in individuals. You will sometimes find them remarkably large, with milk-white spots on the flat surface, indicating defects in the enamel, and at which caries usually begins. In this respect the caries of the scrofulous tooth differs from that seen in phthisical persons with gouty or nervous tendencies, in which it begins between and within the teeth, and most commonly in the lateral incisors of the upper jaw. The teeth may, however, be very irregularly set in the scrofulous, the central incisors leaning toward each other and overlapping, as in a rabbit-jaw."

In his quarterly report on obstetrics, for the *Amer. Med. Monthly*, DR. T. G. THOMAS gives, among other matter, the following extract on osteomalacia, from "Braun's Midwifery:" "In the tubular bones the process always begins first in the denser and more compact shaft, or middle portion, and extends thence to the more spongy ends. The lower extremities are, as a rule, more violently affected than the upper; the parts of the limbs nearest the trunk are usually found diseased in a higher degree than the more remote; in the spinal column, the affection for the most part diminishes in intensity from below upward. The bones least implicated are always those of the cranium and face. The teeth remain constantly exempt, except that in consequence of softening of the alveolar border they sometimes become loose and fall out. The cartilages also maintain generally their normal condition; only in some few cases they are found to have become thinner, or more easily separable, than is natural from the underlying bone."

It is stated (*British Med. Jour.* and *Amer. Med. Times*,) that "M. PIORRY, in a most severe and dangerous case of nasal hæmorrhage, which had resisted all the ordinary methods of treatment, and had continued for several days, arrested the hæmorrhage in the following way: Reflecting upon the fact that he had at times arrested pulmonary hæmorrhage by causing the patient to draw deep and frequent inspirations, he thought that the plan might be adopted in this case. He therefore made the patient sit down, removed the charpie plugs, and ordered him to breathe deeply and quickly. The hæmorrhage ceased almost immediately, to the great satisfaction of the professor and his pupils. Ligatures were then applied for a time above the calves of the legs, and above the forearms. The hæmorrhage did not return."

The *Amer. Med. Times* says "a new hemostatic agent of great power has been recently announced. It is an extremely delicate and beautiful fern from Java, the Pengawar Jamba, (*Palea Tibotti*,) provided with very fine filaments, which are said to be used for the above purpose with great effect."

Among other desirable inventions suggested by the *Sci. Amer.*, is one to supersede the necessity for the use of the teeth in tearing cartridges, in order to thus prevent the injurious action of the constituents of the powder upon the mouth and teeth, as well as to avoid the dreadful thirst occasioned thereby.

In the course of a bibliographical notice of the "Technologist," in the *Lancet*, it is mentioned that among the contributions "is a record of the most remarkable specimens of native gold, comprising as many as 150, the largest weighing 2217 ounces, and which was sold at Ballarat in 1858 for £10,500. It appears also that the purest nuggets, like native silver and iron, are never found absolutely free from alloy."

A correspondent of the *Chemist and Druggist* says, a simple and economical "process for obtaining an almost colorless solution" of gutta-percha "is by simply adding as much chloroform to the gutta-percha as will make a thick paste. This paste is then placed in very hot water, and kneaded with the fingers. After considerable manipulation the gutta-percha loses much of its color, and if this process is repeated, becomes very nearly colorless, having only a pale straw tint. A chloroformic solution may then be made of any strength, which is useful for many purposes—when thin, as a substitute for court plaster, and when thick, as a stopping for decayed teeth. The quantity of chloroform used at first is of course lost, but this is very small."

According to the *Chemical News*, a soluble glass may be made by mixing "ten parts of carbonate of potash, fifteen parts of powdered quartz, and one part of charcoal. Fuse well together. The mass is soluble in four or five parts of boiling water, and the filtered solution, evaporated to dryness, yields a transparent glass permanent in the air."

A contemporary states that a "pickle used for coloring gold consists of nitric acid, eight ounces; muriatic acid, one quart; salammoniac, two ounces; alum, one ounce; and water, two gallons. The articles of gold are dipped in this for a few seconds, then washed thoroughly in pure water and dried. Pale brassy gold may be made to assume a deep reddish shade by using such a pickle or 'dip.'"

Mr. H. Talbot Higginson invites attention, through the *Dub. Med. Press*, to the method of applying leeches by inserting them separately in a conical tube of clean, stiff paper, "having a hole in the top just sufficient to let out the head of the leech. When the leech has stuck, you simply let the paper untwist, when it will leave the leech hanging by itself, thus overcoming the often great difficulty in getting leeches out of the leech-glass. You can also direct them to any part. The leeches will take much better if kept out of water two or three hours before being used."

THE

DENTAL COSMOS.

NEW SERIES.

Vol. III. PHILADELPHIA, JULY, 1862. No. 12.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries of the teeth has given rise to a great deal of speculation as well as experiment, and still young and old patients are losing their teeth, it seems, more rapidly than ever, spite of all that is known. Some authors have labored to divide caries into several different kinds, but there is but one kind—the only difference is in the degree of intensity with which it makes its progress in different individuals, and at different periods of life, varying with the habits and constitution of the patient. The variability of decay in some patients is so uncertain that it is impossible for a dentist to predict what will be the result for any considerable time ahead. It is very unwise for a dentist to tell his patients that in five or in ten years they will not have a tooth in their heads. The best thing a dentist can do is to impress upon the minds of his patients to keep constantly on the watch. We have a large number of patients with whom we make another or future appointment, when we have put their teeth in complete order—say from one month to six weeks or two months off. If such course were not pursued they would either get the nerves exposed, or lose their teeth. We placed the teeth of a lady patient, as we thought, in good condition, on the eleventh of May, and gave her a clearance for two months until she would get over her usual attack of hay fever; but she called on us on Friday, the thirteenth of June, without an appointment, and there were three cavities discovered. This may seem strange, but the facts in the case may perhaps give some light on the subject. A few days after she returned home to her country place, she was attacked with a succession of white, ulcerated spots all over the mouth, which kept her in the most distressed condition imaginable. When these passed off, she thought it best to get her teeth examined, and the result was as stated above. It is not unfrequent that patients get out of confidence with their dentists. Because in a short time after having visited them they discover a decay, or some tooth becomes uncomfortable, they begin to question the carefulness of their former dentists, and seek the advice of others. Now here is a very difficult point to manage, and doubtless every dentist who has practiced a quarter of a century will agree to it.

A few weeks since, a young lady from a distant city, twenty-five years of age, called to get her teeth examined, when *ten* cavities were discovered. This *killed* her dentist for all time to come, in her mind. "He is getting too careless! He is too fond of going to parties! He is attending too much to pleasure, and that is the way I am losing my teeth!" and many other similar expressions fell fast from her lips. Now the truth is, this poor girl's teeth are never comfortable on account of the acidity of the mouth; and if her dentist had told her, or impressed it on her mind to pay him monthly visits, he would have saved himself the charges and have done his patient great service. He had plugged one cavity for the patient only three weeks before she made her call upon us. If the dentist had not been one for whom we entertain a high respect, and to whom we have referred patients for many years, the fact would not be of much value. We have just finished a series of operations of seventeen plugs, for a young lady, nineteen years of age, from the same city. Now it seems that a dentist does not do justice to his patient or himself, when he places his teeth in good order and sends him away to return at his own pleasure.

(To be continued.)

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TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

BY DRS. CH. ROBIN AND E. MAGITOT.

[Translated for the Dental Cosmos, from the "*Journal de la Physiologie de l'Homme et des Animaux,*" Dr. E. Brown-Séquard, editor, by E. Sureau.]

§ 4. *Epithelium of the organ of the enamel.*

The organ of the enamel is surrounded, on all sides, by a continuous epithelial bed, formed of a single range of cells. These cells are prismatic, and are situated vertically at the bulb-face of that organ;* while the cells are small and polyhedrical at the follicular surface, and often reduced to a bed of nuclei, with an interposition of undivided amorphous matter. The continuity of the bed, composed of these two varieties of epithelium, can be proved quite easily on successful preparations, taken near the thin edge of the organ of the enamel situated in the groove formed by the junction of the bulb and the follicle. The bed of prismatic cells is more adherent to the corresponding part of the adamantine organ than the portion constituted of small cells. The latter always adheres to the follicle when the organ of the enamel is softened.

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* It has been already stated that the cells of the enamel were discovered by Purkinje and Raschkow, who called them *fibres*, vertically juxtaposed and secreting, like a gland, the prisms of the enamel in the shape of an organic lymph, combining afterward with the terreous principle, (*loc. cit.*, 1835.) They have been better described by Schwann, (1838,) who termed them *cells of the enamel*, or of the *mem-*

a. The cells of the prismatic epithelium of the organ of the enamel.

GENESIS OF THE PRISMATIC EPITHELIAL CELLS.—These cells at the bulb-face of the organ of the enamel are in immediate contiguity with it on the one hand, and with the surface of the bulb, or the *membrana præformativa,* on the other. They originate in the following manner, at an epoch when the bulb is still small, and the organ of the enamel thin :—

A considerable quantity of ovoid nuclei originate between the two organs of the ivory and the enamel, the separation of which is determined by them. These nuclei are soon surrounded, especially at the two extremities of their greatest diameter, by a certain quantity of finely granulated, transparent, grayish, amorphous matter. The latter, thus produced, soon becomes divided into segments in the direction of the length of the nuclei, and each of these, accompanied by a corresponding portion of amorphous matter comprised between the two lines or planes of segmentation, constitutes one cell.

The whole of these cells, thus ranged vertically side by side, form a continuous bed, (Raschkow's *membrane of the enamel,*) interposed between two germs. When an entire follicle is examined under the microscope, at this period of the evolution, this bed appears like a clear and transparent band, (plate ii. fig. 3, *c.*)*

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brane of the enamel, and considered the prisms as the result of their ossification or repletion by terreous salts. These denominations, and this manner of considering them, have been generally received since that time with only some variations until Huxley. Todd and Bowman, who have more successfully described and represented the general arrangement of the tissue of the adamantine organ and its cells, named the latter very correctly *the columnar epithelium,* (*Physiological Anatomy,* London, 1847, 8vo. Part iii. p. 175.) They call the bed of the prismatic cells *the matrix of the enamel.* They also make each prism of enamel proceed from a consolidation of cells—each of these prisms gaining, subsequently, an addition of matter from the side of the pulp of the enamel in order to increase the thickness of the casing of the teeth.

* M. Guillot (*loc. cit., Annales des Sciences nat.,* 1859, vol. ix. pp. 293 and 310) terms the whole of each follicle *the initial spheroid of the teeth,* the bulb *the nucleus,* and the organ of the enamel and the bed of its cells *the middle zone.* He is mistaken in considering the bed of the cells as appearing before the organ of the enamel,

A certain number of free nuclei in the small follicles remain between the organ of the enamel and the continuous range of cells, at the surface of the non-vascular tissue of the organ of the enamel. Consequently, a quite considerable number of these detached and floating nuclei are always observable beside the cells.

The epithelial cells originate and are developed at the surface of the organ of the enamel, as, for example, the cells of the prismatic epithelium are produced at the free surface of the chorion of the mucous membranes.

These cells do not originate in the thick part of the most superficial substance of the organ of the enamel, as occurs in the cells of the ivory.

Characteristics of the prismatic epithelial cells, (plate xii. figs. 6, 7, 8.)—Each of these cells, considered separately, represents a small, prismatic column, with five or six sides, contiguous, at the same time, by each of its extremities to the two curved surfaces of the organ of the enamel and the dental bulb. They are very narrow and elongated, the dimensions being always equal and rectilinear, notwithstanding the inflections of the parts with which they are connected. When isolated, on the contrary, they take the most varied forms and curvatures, and very rapidly become cylindrical, swelling sometimes at one extremity. The width, three thousandths to five thousandths of a millimetre, is almost uniformly the same in all species of animals; the length, on the contrary, varies from two hundredths to five hundredths of a millimetre, and reaches, in certain species, (the calf and hog,) nearly to one-tenth of a millimetre. The outline of the cells is ordinarily distinctly marked, and each extremity squarely cut. Their whole extent is uniformly sprinkled with fine, pale, grayish granulations, of equal size. In the midst of each cell is an ovoid nucleus, with a distinct, dark outline, and a finely granulated and transparent centre.* The nucleus is elongated in the direction of the length of the

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and under the form of a double range of cells, (which he calls *molecules* or *cellules*,) as that organ is doubled into two divisions by its development. Neither does the organ of the enamel increase by the transformation of these *molecules* of the exterior division into *corpuscles* or *polygonal* cells, (pp. 295 and 311.) He calls the proper wall of the cell the *third zone* or *exterior zone;* but, as we have seen, it is not correct to say that its formation is late, as "the development of this sac is one of the ultimate details of the production of the teeth; as we can prove its existence only at the moment when these organs, losing the primitive softness which characterized them, and being penetrated with limestone, become solid," (pp. 295, 296, and 311.) The treatise of M. Guillot contains, besides, some omissions that are to be regretted; thus, he does not treat of the cells of the ivory, nor of the method of its production, any more than of the manner in which the enamel is produced.

* We have never met an instance in which the nucleus was nearer to the extremity which adheres to the organ of the enamel than to the other, though Hannover describes and represents this as being the case, (*loc. cit.*, 1855, 4to., p. 24, figs. 18 and 19.)

cell. Its almost parallel edges and rounded extremities give it, sometimes, the form of a player's cat. The length is from fourteen thousandths to eighteen thousandths of a millimetre, and the width is usually equal to that of the cell itself. The nucleus is sometimes larger than the cell, in such a manner that it extends beyond the limits of the latter, or causes a small swelling in the cell at its level.

The prismatic cells have, besides, certain special characteristics derived from the chemical reactions; water swells them, and renders them cylindrical; glycerin has no effect upon the nucleus, but makes the body of the cell a little paler. Alcohol contracts them like all the anatomic elements in general; weak acids render the nucleus and its granulations more distinct, and the outline of the cell a little more pale; in the concentrated condition, they gradually disorganize its substance, the granulations of which, however, continue to exist, and unite themselves into a small, informal mass.

By uniting, in considerable number, at the lower face of the organ of the enamel, the preceding cells constitute a continuous bed of immediately juxtaposed cells, the depth of the bed being measured by the length of these elements.* Thus, one of the extremities is directly contiguous to the organ of the enamel.

Nothing can be more regular, and at the same time more elegant, than this union of cells, either when free and floating in the preparation, or adhering to the contiguous organs. These shreds are of rather a dark-gray, semi-transparent tint, which does not prevent the subjacent elements being perceived through it when the focus of the object-glass is lowered. These shreds or strips, when observed on the surface, are remarkable for the mosaic-like appearance exhibited by the regularly and elegantly juxtaposed five or six-sided prismatic cells, (plate vi. fig. 3.) Their nucleus, when observed from one of its extremities, appears to be circular, and touching the sides of the preceding small polygons, that is to say, the lateral faces of the cell; in this position the nucleus appears a little darker than when it is viewed in the direction of its length. In these conditions, also, the mosaic-like bed appears as if it were formed simply of these contiguous nuclei, because the body of the cell, when viewed from one extremity, does not appear the same as when it is inclined or imbedded. A very narrow, clear line separates each cell from the one lying next to it.

When the ivory covers only the gingival surface of the bulb, and has not yet extended over the sides, the epithelial bed spreads beyond the ivory, as far as the organ of the enamel, that is to say, into the vicinity of the point of continuity between the bulb and the follicular wall. These cells adhere to the organ of the enamel, when it is extracted, rather than to the circumference of the bulb. Some of them, however, but not many, remain against the latter, and can be removed with the scraper. They are generally a little shorter than those which cover the cuspid or sharp portion of the crown. Consequently, they are more exactly like the prismatic epithelial cells in shape than are the others. At the same time, they quite frequently contain some fine, fatty, yellow granulations, which have a brilliant centre, and a dark outline, (plate vi. fig. 8, *c.*)

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* It has been shown that it is this bed which Raschkow calls *the membrane of the enamel;* it is important that it should not be confounded with the organ of the enamel, which is sometimes thin, membranous, and susceptible of being easily folded; neither must it be confounded with the *cuticle of the enamel*, which will be discussed hereafter.

This bed of cells, which is easily detached in quite thick, grayish strips, remains, finally, as we have just stated, interposed between the enamel and the follicular wall, in consequence of the atrophy of the organ of the enamel—this is also the case in the temporary teeth of the ruminantia. The bed always continues remarkable for the elegance of its appearance, arising from the regular juxtaposition of its cells. At the time of the dental eruption, when the summit of the tooth projects only four or five millimetres, the bed is found drawn beyond the follicle, and adhering to the surface of the points on their sides.

After considering the characteristics, which we have just assigned to the prismatic cells, and observing the nature of their chemical reactions, it will not be difficult to recognize them in the preparation. They must not be confounded with the cells of the ivory described in the preceding chapter. The prismatic cells of the organ of the enamel are, indeed, generally much more tapering, and much longer, in proportion to their width than the cells of the ivory. The nucleus, which is placed at one extremity in the cells of the ivory, is situated in the middle in the cells of the enamel, and, moreover, it is narrower, longer, and without any nucleole. Finally, the prismatic epithelial cell never exhibits the prolongation or tail, so frequent in the cells of the ivory, the granulations of which are, besides, less fine and less transparent.

b. The bed of epithelial cells interposed between the follicular wall and the organ of the enamel.

In an earlier part of this treatise we mentioned the presence of a bed of epithelium, which has not been described, and which is interposed between the organ of the enamel and the follicular wall in man, the quadrumantia and carnivora. Among the herbivora, in the molars, it is situated between the former and the organ of the cement.

When we open the follicle of the new-born child at the gingival face and approach the bulb, the follicular wall is overturned. If the latter is then scraped, the epithelium which adheres to its surface is lifted, the epithelium not being always removed with the organ of the enamel, to which it nevertheless belongs. It is found from the groove of junction between the follicle and the wall, as far as the level of the gingival portion of the latter, where it is lost among the vascular villiform folds which penetrate into the corresponding depressions in the organ of the enamel. But it does not cover the prolongations of the follicular wall, and does not envelop them with an external epithelial sheath.

More frequently, the epithelium continues to adhere to the enamel, and the latter exhibits the range of prismatic cells at its inner face, and a thinner bed of the epithelium, now under consideration, at its external face.

The shreds of this epithelial bed are soft, grayish, and finely granulated, like the whole of the prismatic cells, to which they at first seem to bear a general resemblance. But further observation shows that the bed is thinner and more transparent. It is formed, moreover, of small spherical nuclei, from five thousandths to seven thousandths of a millimetre in breadth, a little larger than those of the prismatic cells, but about half as long, sometimes ovoid and short. These nuclei are very close to each other, separated merely by a finely granulated, soft, grayish, amorphous substance. In certain subjects, it contains in places some fine, yellow, fatty granulations, sometimes very numerous, and very close to each other. The amorphous matter is divided in places into small polyhedrical cells by means of pale grooves, which divide it into the intervals for the nuclei; this is especially the case among the ruminants. But this division is not constant, and can exist only in a portion of the epithelial strip.

The cells resulting from this division are small, soft, and difficult to isolate. They are swollen a little by contact with water, and the commencement of the cadaveric alteration frequently changes them into a clear, vesiculiform condition.

Cylindrical Prolongations of the Epithelium.—In the neighborhood of the gingival portion of the follicular wall, and between the villiform folds spoken of above, this epithelium sends off long, full cylinders, which accompany some of the preceding vascular projections, without enveloping them. They resemble long, glandular *culs-de-sac*, but are not hollow and have no proper wall.

They are sometimes simple, but more frequently bifurcated or simply bi-lobed or tri-lobed at the terminal extremity,* while the other end is continuous with the epithelial bed. Their width is generally from three hundredths to four hundredths of a millimetre, but they are frequently of double that width, or, on the contrary, only half as large, at least through part of their extent. It is usual to see the terminal extremity, or each of its lobes, larger than the filament which bears them; thus, the latter often looks like a club, more or less rounded or ovoid, carried by an epithelial cylinder, which is often relatively thin at its extremity, and sometimes so slender that it is represented only by a single bed of cells.

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* Todd and Bowman, (*loc. cit.*, 1847, part 3d, p. 176,) who have fully observed the vessels of the follicle as forming loops, projecting without penetrating into the pulp of the enamel, have pointed out these "short tubes full of glandular epithelium which descend between the vessels, and terminate in a close extremity." They consider these tubes as evidently glandular, but they regard it as difficult to determine how they pour their contents into the pulp of the enamel. We know of no other authors who have mentioned these prolongations. Todd and Bowman do not speak of the continuation of these cylinders with the above epithelium, nor of the latter.

The epithelium which forms them is sometimes divided into small, polyhedrical cells, and sometimes formed of nuclei which are brought together without the segmentation of the interposed, grayish, amorphous matter. In one word, it resembles that of the epithelial bed which has been described above.

c. *Cylindrical filaments of epithelium in the body of the follicular wall.*

Independently of the cylindrical epithelial filaments which have just been described, there are others which are plunged in the tissue of the gingival portion of the follicular wall, not in the gum, but in the extremely vascular tissue of that wall, in the midst of the laminated fibres and loosely intercrossed capillaries which form it principally. Some of them advance even into the villiform, vascular folds. There are also cylinders either regular and full, or exhibiting contractions and dilations, which give them a rather varicose appearance. They are not unfrequently really interrupted one or more times, and the two corresponding ends are retained on the same line, at a greater or smaller distance from each other, by a fasciculus of fibrous tissue which spreads at their surface. Certain portions of the epithelial cylinder thus attached to the others are sometimes very short, rounded, or ovoid, and only from three to five hundredths of a millimetre in width and breadth. In the neighborhood of the preceding, similar small globulous masses are found sometimes altogether free, isolated in the tissue of the follicular wall.

The cylinders of epithelium are generally four hundredths of a millimetre in width, but we have met some of two or three hundredths, and others measuring five or six hundredths of a millimetre. Their length may reach one or two millimetres and more, but rarely. It is easy to isolate them entirely, so as to see their extremities, which are simple, bilobed or tri-lobed, rounded or conoid. They are sometimes bifurcated toward the middle of their length. From one or both ends laminated fibres frequently rise, which, after enveloping the cylinder under the form of a thin bed, are lost in a fasciculus more or less loose and tapering.

The epithelium which constitutes these full cylinders does not resemble that which has been considered above. The nuclei are ovoid, and broader and shorter than those of the cells of the enamel—the width varying from six to eight thousandths of a millimetre, and the length from eight to eleven thousandths of a millimetre. They are sometimes transparent, and sometimes slightly granulous, and usually have a brilliant, yellowish nucleole. The outline of these nuclei is distinct and dark, and they are sometimes almost contiguous. In the next place, the grayish, granulated amorphous substance interposed between them is not divided into cellules. Divided or not, this substance always extends a little beyond the nuclei at the periphery of the cylinder, so that it resembles, at first sight, a proper wall; but the method of rupture in the cylinders demonstrates the absence of this substance. In the midst of the cylinders thus constituted, there occasionally exists one or more rounded or slightly polyhedrical complete cells with a dark outline, the mass of which is usually transparent, as if vesiculous, and it holds the nuclei apart in the place which it occupies. In the other cylinders the nuclei are separated farther from each other than in those just mentioned, and the interposed amorphous matter is divided into polyhedrical cells, which are pressed against each other, and which sometimes contain, besides their grayish granulations, more or less abundant fatty granules. In the midst of the preceding cells there are often one or two, which are rounded, limpid, and vesiculiform in appearance.

From what has been stated, it may be seen that these filaments, notwithstanding the fact that they have a common base of structure, exhibit quite numerous variations in their general aspect. They are more rigid than those described in the first instance.

At present it is impossible to do more than build hypotheses upon the office filled by these organs. It is difficult to judge whether these two sorts of filaments have one origin and different offices; or whether the last-mentioned filaments are only some of the others which have been entirely englobed by the tissue of the wall while it was increasing in thickness, the elements being afterward hypertrophied.

It is not unusual to find some calcareous concretions in the follicular wall, near the preceding epithelium or the last cylinders which have just been considered. It is especially near the time of the eruption of the tooth that they are met, as well in man as in the ruminantia. They are globulous, or mammillated, irregular in form, sometimes exhibiting a small excavation toward the centre, and are of a pale-yellowish tint.

(To be continued.)

DISEASES OF TEETH, THEIR CAUSES AND TREATMENT.

BY W. H. ATKINSON, M.D.

To enable us to understand *disease*, we must study function, or the proper antegrade movement of organ or system of organs in harmonious play, constituting "*ease*" or *health*. Any departure from this, in any degree, in deflected or retrograde direction constitutes *dis*-"ease," or the beginning of death. So harmony constitutes health, and inharmony institutes the disruptive, disintegrative or discordant action whose ultimate result, if not arrested, is death, or complete dissolution of the cell, tissue, organ, or system in which the action takes place.

Health is then that just and equal balance of the nutrient forces that takes away the cell-debris and recuperates the weakened, worn cell with the exact quantum of that unseen something in the elemental pabulum necessary to make it efficient for its work, leaving no excess of debris or pabulum. As teeth are compounded of tissues of varying amount, in quantity of life-force as well as of quality of the organizing presence of the complex form-type, it will be pertinent to concisely state the natural status of each tissue, and its correlations with the organic world at large.

The enamel simulates the mineral kingdom; the dentine, the vegetable; and the pulp, the animal. Hence the nutrient function of enamel is the nutrition of the crystal, and nothing more. The nutrition of the dentine follows the capillary and porous examples of the vegetable kingdom; while the pulp proper is amenable to the laws of the other soft and vascular tissues of animal life, and may be subject to inflammation in its inception, and stages of progress or arrest, precisely like other connective, cellular, nervous, and vascular tissues of the animal body.

Disease will therefore be modified in accordance with the elevation in the scale of being of the tissue in which it occurs, and as the various tissues have very different degrees or diverse measures of the vital presence, there must be different manifestations in the ratio of density, and other modifying circumstances. Hence the diagnosis and treatment of the diseases of the teeth may very properly occupy our earnest attention as a specialty. To understand which we should pay particular regard to the nutrition of enamel, dentine, cemental, and pulp tissues—the latter of which is very nearly allied to other soft tissues of like structure in the less confined positions, and with this exception are amenable to similar treatment. But enamel and dentine having little or no power of reproduction, we are limited to the prevention of disintegration, or the substitution of adventitious material able to resist the fluids of the mouth in cases in which these substances are broken down. The great step of importance is to know when disintegration has actually set in. And this requires all our knowledge and best skill at diagnosis to correctly determine.

It is well known to every practitioner of considerable experience that it is very rare for the patient to have an adequate conception of the true condition of his teeth and oral tissues. So long as there is no actual pain, and no unsightly spots present themselves, the unfortunate patient takes it for granted that all is well, which may be a gross mistake.

Every person should be under the watchful care of competent skill, to point out the inception of disease, and to either antidote it or ward off its portentous consequences by a timely, faithful, and thorough application of the proper remedies. Until something like these sentiments have taken possession of the minds of the profession, and the people, (for it is requisite that the people know their needs,) we shall have abundant cause for the best and greatest quantity of mechanical skill in adapting artificial dentures. For it is notoriously and painfully true that the people care more for their money than for their lives; and if this be so, it is also certain that the lives of their teeth are regarded in the ratio of their size to the bulk of the whole of their personality, and, therefore, under the reigning standard of appreciative value of system and organs, we must not expect that the people will at once give the requisite attention to the intangible (to them) study of the life-actions, in tissues of which their teeth and whole bodies are so nicely made up. It is well established that the consciousness of disease is in no sense commensurate with the progress of the destructive process in the tissues. This is said to be true especially of the mucous surfaces, and the great plexuses of the ganglionic system, and the convolutions of the cerebrum. That disease, in some cases, benumbs the sentient perception to such a degree of obliviousness as to render it insensible to the danger with which it threatens the organism, is exemplified frequently in the hopeful and nonchalant state of mental apprehension of those far gone in tuberculosis of the lungs and other vital organs.

It is not to be looked for, that the patient, or the careless, cursory survey of the dentist even, will detect the incipient stages of the diseases of his teeth. And these are the very stages above all others in which the most good can be done for them, and the highest, because most useful services can be rendered to them.

Listlessness, and a downright apathy, is the almost sole cause of the wholesale loss of health, of general and dental system. And who is there among us all who have dared to declare the whole counsel of the gospel of soundness of body, and soundness of mind consequent thereupon, to all with whom we have come in contact in a professional capacity? Echo answers, who! And thus it too often is, when the most vital queries concerning our life mission are plainly put, the earnestness and pointed questions of the querist instead of stirring the God within us to the acclaim of a warm response, meet with silence and indifference.

My beloved fellow-members of my adored profession, let it not be said that we who represent the progressive element of our body as a scientific association, have coincided with this general narcotism of a love of ease, and mistaken advantage of both shutting ourselves out from the light of a knowledge of disease in its every stage and phase, or having been made recipients of such knowledge, do that worse thing, shut others out of it by shutting it tightly within the small limit of our small brain, and the confines of our operating rooms and laboratories. But let us come together and reason upon the principles and practices necessary to lift, first ourselves, and then our poor, helpless, and suffering patients, out of this slough of despond, by acknowledging the nutrition of each tissue, and investigating the laws thereof so closely and earnestly that each consciousness shall be illuminated up to the point of demonstrable perception, and then we will truly begin to be fit teachers one of another.

Enamel, doubtless, has a sort of low vitality, and if so, a kind of nourishment. This, some severely matter-of-fact, fractional sort of minds, who have hitherto held the field to the exclusion of the clear-sighted, synthetic sort of mind approximating wholeness, no doubt will deny. If any such count themselves to have attained the truth in this regard, they are called upon to put their sharpest queries, that this, to them, heterodox statement may be quietly put to rest.

Dentine has also been defined to be a part of those organs which Fox defined as "inorganic bodies attached to the maxillary bones for the purpose of mastication." But since the microscope revealed the indubitable organism of this magnificently beautiful structure or tissue, I believe there has not arisen any one fool-hardy enough to repeat the exploded assertion. The rapidity or want of celerity of the movement of molecules denominated nutrition has nothing to do with the question so long as the action itself is clearly proven to take place. No doubt the action is of a low grade in the vital movements of the very complicated organism of which it is an integral part, and without which this boasted living organism could not be complete. For this very reason it becomes amenable to our manipulative efforts at restoration, or arrestation, thus making the organ useful to this boasted living system until it shall have no further need of this insignificant coadjutor, in the rôle of life-actions necessary to prepare the inner and unseen organism to pass another phase of its rôle, and go to seek further labors of use and enjoyment.

The next tissue in the order of endowment of life-force is the cementum or intermediate connecting link between bone proper or true bone, and the last—dentine.

Just as we advance in the scale upward do the tissues display higher and higher order of nutrient ability. The first apparent expression of this power of recuperation is displayed in the modification of tissue exactly intermediate between cementum and dentine, denominated secondary dentine. This it has been thought was liable to disintegration or solution *in situ*, and resolidification when returning health reaffirmed the normal nutrient action in this structure.

There is less reason to dispute this action as taking place in cement. A mere hypertrophy of this tissue constituting exostosis is common. And wherever the periosteum is not destroyed, resolution of the calciferous salts no doubt may take place, to be absorbed and dispersed in some cases and conditions, and under more favorable circumstances resolidified, constituting a new stratum of the exostosis, increasing its *bulk* in the ratio of the quantity of lime salts contained in the plasm here inclosed. But in cases where the periosteum is destroyed a very different result takes place, in which the cementum is usually dissolved and dispersed by absorption, or the formation of abscess, taking the regular course of rupture. This usually also involves the periphery of dentine to a greater or less depth into its deeper and larger tubules and connective calciferous substance. At times, even at this stage of disease, spontaneous or surgical means may arrest the destructive process and institute recuperative actions, under which a very beautiful covering of cement or exostosis completes the cure and renders the fang capable of normal function again. These last statements are capable of proof under the close and satisfactory scrutiny of properly-selected, prepared, and mounted slips of the tissues involved, a number of which I have in my possession, for microscopic inspection.

The diseases of the pulp are of much greater difficulty to detect, point out clearly, and treat than the more simple foregoing structures. Rheumatism, neuralgia, and inflammation all belong to this organ, and require the same diagnosis and treatment that they do when occurring in other parts of the economy, modified by the isolated and confined condition of the particular structure. It is fortunate for operator and patient that extirpation scarcely disturbs, even infinitesimally, the functions of the general system, and but slightly reduces the strength of a well-constructed tooth.

So in all desperate cases we need not exhaust our skill and time, nor the patience and time of the patient before deciding promptly to remove the offending integer of the body politic of this community of organs called a complete human frame.

Having now, in a cursory manner, surveyed the diseases to which a tooth is liable after it has been once fully and correctly developed, (for I have not alluded to the diseases the preformative structures are liable to, although of the highest interest and importance to the dentist, and to the whole race of tooth-growing and tooth-abusing men, women, and children,) I will serially state in a very concise manner some of the best modes of treatment of the different dental tissues, when the subject of disintegrative forces.

All we can do when the enamel has begun to be broken down on the ends of the columns or fibres is to dress down the ragged and softened surfaces to a level with the portions still maintaining their normal strength and arrangement, by means of some smoothly-working mechanism, and then finely polishing and finishing the new surface, ordering strict cleanliness, and necessary brushing and polishing daily to secure them against the lodgment of acidifiable or alkaline accumulations of considerable strength or quantity, and a *constant use* of all the teeth in the mouth daily, in biting and mastication.

The dentine may be treated, when not too deeply diseased, by identical reparative and prophylactic means. But in cases where the cavities of decay are deeper than broad, the proper method is to perfectly remove all disintegrated portions, and having carefully dried the cavity, apply pure creosote to its depth, then fill the excavation with some indestructible substitute.

To pursue the order of elevation in tissues, the cementum would next properly claim our attention, and therefore the circumstances under which it is most liable to demand treatment will engage us before or rather simultaneously with our delineating the necessary treatment to arrest diseased action, or restore the tooth to a tolerance within the alveoli. Some stage of the process of nutrition called inflammatory, must be present before we have any disturbance of normal function sufficiently active to call attention. The commonest form of this is displayed in the roots of teeth that have lost their antagonists, or have become so diseased in their crowns or roots as to preclude the stimulus of vigorous use. Systems in which the gouty, rheumatic, or neuralgic diathesis is present are most frequently the subjects of this sort of attack. In all these last enumerated cases, constitutional treatment will be indicated, alone or conjoined with surgical and topically applied medicinal means. But in cases where the difficulty depends upon the loss of mechanical stimulus of antagonism of their fellows, the best method to pursue will be to supply the means to restore this pressure to them again. Where this cannot be done, each paroxysm may be cut short by simply cutting into the congested membrane by a strong, sharp instrument, thus relieving the tension by allowing the plasm to escape. Effect this, and your cure is complete and prompt for that time, if not for life.

If the hypertrophy have gone so far as to encroach upon important vessels or nerves, extraction is the last and efficient method of removing the trouble.

The treatment of diseased pulp alone remains, and we close this paper. Constitutional means will be demanded when the local disease depends upon systemic causes; local treatment, when local causes alone exist, which, by-the-way, is next to impossible—a liability to disease always expressing constitutional debility in the degree of its presence. I am fully aware that this definition reduces to a fearful degree the number of persons in a healthful state; but it is not the effect of the statement itself, for that would be of little importance if the facts making it true were not present. So we will have few diseased nerves amenable to local treatment other than a prompt extirpation.

All placebos and expectante forms of treatment are examples of purely constitutional treatment, and with correct regimen not the least efficient for good.

Probably the very best general treatment for all inflammations, and therefore of pulps, in this state, is severe and continued nausea by any prompt means, until the action is brought under control. To effect this without emesis, we must be careful to establish a tolerance of the agent, or after-debility will in some small degree detract from our efforts at restoration.

Where this alone, or combined with local or general narcotism, or both, does not relieve the patient promptly, deep scarifications over the whole length of the fang or fangs of the diseased tooth may be added. If the pain is still persistent and purely local, (which will not occur once in a hundred cases,) then proceed at once to extirpate completely to the foramen, and dress the empty chamber with your choicest allayer of pain—mine is usually creosote. Chloroform often works like a charm. The salts and decoctions of opium, camphor, ether, etc. come in useful play. As soon as all pain and local tenderness of the tooth and its connections have subsided, proceed at once to enlarge your cavity, nerve-chamber, and canals to near the apex, and fill them tightly and perfectly with the best material; and if the patient is in even tolerable health, and you have properly discharged your duty to him in all respects, one of which is to advise him to live rationally for the time to come, he will be in a fair way to enjoy the use of his tooth to the end of his life.

New York, January 23, 1862.

OXY-CHLORIDE OF ZINC.

BY H. N. WADSWORTH, D.D.S.

"In no conversation upon professional subjects, either with the *scientific* or *ignorant*, do I fail to learn and treasure up *some* useful idea, that can be worked to a successful result in the future," was the remark made to me a few days since by a distinguished member of our profession in Philadelphia.

The remark calls forcibly to mind an interview had in the year 1859 with a most uninviting specimen of the *genus homo*, and was thus, so far as remembered. Being hard at work in our office, we observed a tall, sandy-haired man, of a smirking, self-satisfied air, combing his whiskers with his fingers, arranging his shirt collar, and performing sundry items similar to those standing in front of a mirror, and betokening an exceeding satisfaction in his countenance, rush up to the bell, and pulling it with violence, announce himself to the servant as "Dr. Pearson," of New York! (preferring to push past the servant, instead of waiting my leisure.) He quickly made his entry into the operating room with a flourishing, cringing bow, volubly expatiating upon his "osteoplastic" for filling teeth! "only three dollars a bottle;" "like to have so distinguished and discriminating a surgeon-dentist for my customer;" "no humbug, no deception, show you in a minute;" "could not leave address;" "could not leave sample for experiment;" wanted me as a customer, and would finally let *me* have a bottle for one dollar!

Taking up an instrument, preparatory to going on with my labors, I replied: "You and your stuff are a humbug, and the sooner you leave my room the better I shall be pleased."

He had the card of every dentist evidently that he could obtain, but no recommendations or letters. I felt vexed. *There was* a filling in his own tooth, *hard* and *good;* said it "had been in over a year." There was the paste, hard as cement, on a glass slab and in a tooth on the table. I pondered over it for two or three days; tested the composition with acids; wrote finally to S. S. White, New York, for a bottle of "Pearson's Osteoplastic," which arrived in due time, and I immediately commenced experimenting with it. In justice to Dr. P., let me here add that, on visiting New York, I became satisfied my visitor and the doctor are two different persons.

Oxy-chloride of zinc is prepared in various ways, and of extremely varying quality, all more or less imperfect and unsatisfactory, until I obtained that prepared by Dr. J. H. Smith, of New Haven, Conn., and prepared after Dr. J. T. Metcalf's formula. *This article* bears evidence of care in its preparation, and, as far as I can judge, is decidedly good. It can be obtained of S. S. White, Philadelphia, and I presume at other similar establishments.

The preservation of the pulp of a tooth has engrossed a great deal of my attention as a dental practitioner. It is a work of nicety and skill to destroy, thoroughly remove the pulp, fill, and finish without leaving any irritation of the periosteum; but it is a *greater* evidence of science, of cautious, persevering study, well directed and skillfully applied, if we *preserve* the pulp of that same tooth—provided five or ten years, or even *two* years ago, we should have considered it impossible. I claim an advance in the science of my specialty when, in many cases now, I can speak with certainty of the preservation of nerve pulps, that three years since, in *my* hands, was impossible. In some cases in my first experiments it was applied to teeth that the usual temporary stopping, which I had tried, failed, and my patient returned with a painful tooth. In *these* cases it was a simple experiment, *warranted* by the condition of the tooth, inasmuch as it could only end in arsenious paste under *any* circumstances, and it *might* succeed in quite a number. It did; and, as far as no pain, up to the present time, and a light, healthy expression of the bone is an indication, it is fair to draw a favorable conclusion.

Let me not be misunderstood. A nerve once suppurating cannot be filled over by any material whatever without *serious* consequences; but if it is only slightly inflamed, and particularly if a particle of soft, partially decomposed bone exists over the pulp, it *may* and can generally be saved; and the oxy-chloride of zinc is by far, in most cases, the best material for the purpose. In one case the present year, in removing the bone over a superior incisor, the nerve was lacerated, and *bled.* This was a fair and legitimate case for its use; and I did use it, and, as far as the time elapsed can prove, successfully.

I do not intend the stopping in *one of these cases* to be permanent. In no case do I trust it more than six months, and generally not over two or three. Upon removing it, if the bone covering the pulp has been partially decomposed, I greatly prefer removing only sufficient of the plastic stopping to enable me to fill, leaving that as a floor, to protect both as a non-conductor and plate, the softened and irritated bone lying immediately over the pulp. This plate excels everything it has ever been my pleasure to try, and though in many shallow cases it cannot be retained, yet even in these, if in removing part I am unfortunately obliged to do so to all, it is easy to replace a small portion, leaving it twenty-four hours to harden, and then fill over it with gold.

That the oxy-chloride of zinc acts, to a certain extent, as an escharotic, is undoubted; hence the pain. But the almost certain result, after that pain has ceased, that it will not return is, in nearly every case in which I have tried it, undoubted, and, provided there has been no suppuration of the pulp, an almost certainly favorable operation may be anticipated.

I do not think any dental practitioner can always prognosticate with certainty the preservation of the pulp of a tooth when the tooth itself is in an advanced stage of decay, and in all cases his hope of success must be on the *assumed* ground that the pulp, up to the time he commences, has been unexposed and uninjured. Previous pain of a continuous character would always, in my opinion, indicate such injury, and call for arsenious acid alone, as the remedy preparatory to removing the pulp.

The oxy-chloride of zinc must be manipulated with extreme delicacy; absolute freeness from moisture in its use is essential until it "sets." It should be used only just pasty enough to mould, to prevent too much free chloride from acting upon the tender and inflamed bone. In doing this I use a small quantity at first, which is attached to a small stick or bent instrument with beards upon, and on which I roll a bit of cotton, something as a "swab;" attaching a little of the paste to this as dry as I can possibly use it, the cavity is carefully swabbed and coated; then the mass is applied as quickly as it can be prepared, and readily adheres to that already introduced on the sides of the cavity; as soon as full, devote myself to keeping the surroundings dry for a few moments, and then wash the mouth with soda and water, to neutralize any little acidity remaining.

The tender, sensitive teeth of young persons will never develop inflammation if first filled in this way, and then followed with gold. The tender, inflamed bone over many a pulp may be allayed successfully, and afterward filled over with impunity. The softened bone over the nerve, often partially decomposed, which we all know is so difficult to treat otherwise than by a destroying agent, can, in nearly all cases, be preserved, and the pulp saved by this method.

I have observed a marked improvement in a number of front teeth where the bone has become discolored by decay immediately on the pulp, by leaving this cap when the tooth is to be filled with gold, the cap of oxy-chloride of zinc being white, covers and conceals the dark bone and relieves that disfiguring expression we so often find it impossible to prevent, appearing through the thin enamel of a front tooth, knowing full well the removal of this bone would expose the pulp.

As I have previously remarked, the article prepared after Dr. Metcalf's formula is in my opinion decidedly preferable to any other that I have used; the material hardens much faster, and, presenting a nearer resemblance to the bone, it at the same time remains hard; and in the time I have been using it gives me decided pleasure. What the result may be in the future in those cases where the pulp has been actually wounded, as mentioned previously, is yet to be *proved.* Heretofore in my practice such a case was always treated as alone safe when the pulp had been carefully removed; yet, having such gratifying results when applied in cases, in my opinion, almost as unfavorable, has led me to experiment a little further, inasmuch as it could be done quite conscientiously, as respects the good of a confiding patient. My professional friends will also understand that I do not consider enough time as having elapsed to warrant me in saying that those cases looked upon as nearly hopeless, in which pain has followed the application of other temporary stoppings, for the urging a renewed deposit of dentine, and consequently the removal of those stoppings and the experimental trial of the plastic one, the favorable result after a good deal of pain, and the successful filling with gold afterward; I do not wish to be understood as positively deciding that these cases may yet, some of them, result in a necessity to resort to arsenious acid and removal of the pulp; but I do say, a question very difficult of solution, and which time alone can solve, is, whether the plastic causes healthy deposit in any case in which it is applied by its stimulating effect, or only cauterizing the fibrous vessels superficially, it allays at once and permanently all source of irritation. That the pain caused is the result of superficial action, is in my opinion undoubted.

In conclusion, permit me to add, that during the time my mind was first directed to this article, a patient was in my hands who had two teeth filled in Dresden (Europe) with the same or a similar preparation. On removing it I found, though only partially protecting the tooth, both of them ready for gold, and apparently not so when the preparation was introduced two years before.

Let me commend a careful, judicious trial of the oxy-chloride of zinc to my professional friends as likely to result in much to please and improve our specialty.

WASHINGTON, D. C., April 5, 1862.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY GEO. T. BARKER, D.D.S.

A MONTHLY meeting of the Association was held on the evening of June 10th, 1862, at eight o'clock. The subject of Arsenic being continued from the preceding meeting, for this evening's discussion.

At the monthly meeting in May, Prof. T. L. Buckingham was unanimously requested to favor the Association with an experimental discourse on arsenic, and to exhibit the different methods of testing solutions for the detection of that agent. We present the following synopsis of his interesting remarks:—

He stated that very little is known of the history of arsenic, but it was supposed to have been known to Paracelsus, who practiced in the first half of the sixteenth century. A process for obtaining it was described by Schrœder, in a work published by him in 1649; but it was not until the year 1773 that its chemical properties were examined by Brandt.

Arsenic is classed by some chemists with the metals, and by others with the non-metallic elements; hence we find the descriptions of it and its compounds in the beginning of some works on chemistry, and nearly at the end in others. In its appearance it resembles the metals, and scarcely any one examining it in a pure condition, deposited upon glass, would hesitate to pronounce it a metal; but in its chemical combinations, it resembles some of the non-metallic substances more than it does the metals. He would, however, speak of it as a metal, without attempting to decide whether it was one or not.

Arsenic in a pure condition is found mixed with certain silver and lead ores, and with mica slate; but the quantity is not very great. It is found, as arsenious acid, with silver and lead ores; but the form in which it is found the most abundant is in combination with metals, as iron, cobalt, nickel, silver, copper, manganese, and antimony, or as an acid in combination with the oxides of the above metals, and with lime. It is also found united with sulphur and phosphorus. There are two sulphurets—orpiment, or the yellow sulphuret, and realgar, or red sulphuret.

The metals with which it is found combined in the largest proportion he had mentioned; but many of the other metals also have it in combination with their ores. Arsenic was for a long time considered to be a constituent of the animal body; but is now thought to be present only for a short time after its introduction, and is thrown out by the excretions.

Arsenic in the metallic form is not found in commerce, owing to the difficulty of melting it. When heated, it volatilizes before it melts; and even when heated in sealed glass tubes, the pressure of the vapor bursts the tubes before it melts. It can very readily be obtained by mixing arsenious acid and black flux together, in the proportions of oné of the former to two of the latter, and heating them out of contact with the atmosphere. This may be done in a glass tube, by placing the materials in the bottom and heating with a spirit-lamp; the carbon combines with the oxygen in the arsenious acid, and passes off in the form of gas; the arsenic is volatilized and deposited on the cooler sides of the tube. Some of the arsenic coming over may be recognized by the odor, having a strong resemblance to that of garlic. It may be obtained in larger quantities by putting the materials in a crucible, and inverting another one over it. By heating the lower crucible, the arsenic will be volatilized and deposited on the inside of the upper one. Arsenic is of a steel-gray color, crystalline, and brittle; its specific gravity being from 5·7 to 5·9, it volatilizes at about 360°, and unites in three proportions with oxygen. By oxidization in the air a suboxide is formed, the composition of which has not been determined.

When arsenic is volatilized in the air, it combines with three equivalents of oxygen, and forms arsenious acid, (AsO_3,) which goes under the names of the white oxide of arsenic, white arsenic, or more commonly arsenic. It is in this condition that arsenic is usually found in commerce. It is prepared by heating the ores containing arsenic; the metal is volatilized and combines with the oxygen in the air, the vapors being condensed in flues or chambers. Dr. Ure gives a description of the arsenical furnaces in Silesia, in which cobalt ores to the amount of nine or ten cwt. are heated at one time in a muffle; the volatile products are made to pass through several chambers where the arsenious acid is deposited. In Bohemia and Saxony the ores are roasted in reverberatory furnaces with horizontal flues; the arsenic is converted into arsenious acid, and is condensed on the sides of the flues. By this process it is not sufficiently pure, but has to be resublimed. This is done in iron pots with cast-iron heads; the impure arsenious acid is heated until it volatilizes, and is condensed in the heads. If the heat has been raised high enough, the arsenious acid will be vitrified, and as transparent as glass; but after exposure for a short time, the surface becomes white and opaque, owing to a change in the molecular structure. This change gradually goes on until the whole has the appearance of porcelain. We occasionally see some piece which, when broken, shows the vitreous appearance on the inside.

Arsenious acid (AsO_3) is found in the stores either in masses or powder; the former condition is the purer, as the powdered is frequently adulterated with chalk or plaster of Paris, which may be detected by heating the acid on a clean piece of metal or glass, when the arsenious acid will be volatilized and the impurities left. The specific gravity of arsenious acid is about 3·5 to 3·7; it rises in vapor at about 425°, but requires a higher temperature to melt it. The solubility varies, some specimens being more soluble than others. It may be stated, however, in round numbers that 100 parts of water at 60° will dissolve 1 part of the acid. When the water contains a small quantity of potassa or soda, it dissolves a much larger quantity of the arsenic.

Arsenious acid combines with bases, and forms a series of salts termed arsenites. A higher combination of oxygen with arsenic was discovered by Scheele, and is the Arsenic acid AsO_5. It may be obtained by distilling a mixture of one part of hydrochloric, twelve parts of nitric acid, and four parts of arsenious acid; the arsenic is oxidized by the nitric acid, and nitrous oxide is given off. This acid is formed when the sesquioxide of iron is given as an antidote for the poison. A portion of the oxygen is transferred from the iron to the arsenic, which then combines with iron to form a subarsenite of iron.

Arsenic may be detected, when it is free, or in almost all its combinations if they are solids, by throwing a portion of them on burning charcoal, when the odor will be easily recognized; or when heated in a glass tube with black flux, the arsenic will be deposited on the sides of the tubes as metallic arsenic. If it is the form of arsenious acid, it can be volatilized; and if put in a glass tube open at both ends, it will be deposited in a white ring upon the cooler parts of the tube.

Hydrosulphuric acid passed into a solution containing arsenic, causes a slow and gradual yellow precipitate to be formed; if the solution be acidulated with a few drops of hydrochloric acid, a more rapid and complete precipitation takes place. If a portion of this precipitate is dried at a low temperature and mixed with black flux, the arsenic can be separated again by heat. Nitrate, or ammonia-nitrate of silver, throws down in neutral solutions a canary-colored precipitate, which is soluble in ammonia and nitric acid. The phosphate of soda, with nitrate of silver, gives the same colored precipitate as the above. Sulphate, or ammonia-sulphate of copper, in a solution of arsenic gives a beautiful green precipitate called Scheele's green. It should be remembered that a fluid in which onions or garlic has been digested gives a green precipitate, with copper, closely resembling that just mentioned.

The test mostly depended upon to detect arsenic is known as Marsh's test. There are several forms of apparatus, but the most simple one consists of a wide-mouthed bottle of six or eight ounces, having a cork perforated with two holes, through one of which passes a straight glass tube about half an inch in diameter, and about one foot in length; through the other passes a similar tube, eight or nine inches long, and bent twice at right angles in opposite directions, so that when one end points down the other will point up, with one of the ends drawn nearly to a point, so as to have a very small orifice. A few pieces of zinc are placed in the bottle, and covered to the depth of about an inch with water. The cork is introduced, and the straight tube passed down nearly to the bottom of the bottle; the bent tube is inserted with the small end projecting upward. The cork must be made tight with sealing-wax; but if the cork and tubes fit perfectly, the sealing-wax may be dispensed with. To operate with the apparatus, a small quantity of sulphuric acid is poured into the straight tube; chemical action immediately commences, the water is decomposed, the oxygen going to the zinc, and the hydrogen passing out in the form of gas. The oxide of zinc unites with the sulphuric acid, forming the sulphate of the oxide of zinc, which is dissolved. The gas should be allowed to pass off for five or ten minutes; it may then be lighted as it escapes from the small orifice. The reason for allowing the gas to escape for some time before it is lighted, is that a mixture of hydrogen and air is very explosive, and it is necessary to expel the air from the bottle. When the gas is lighted it burns with a very feeble flame, scarcely visible in a strong light. The horizontal tube should now be heated at about its middle with a spirit-lamp, and carefully examined to see if any deposit is made on the inside; a white porcelain plate should also be held in the flame to see if a stain is made on it. This precaution is necessary, as some kinds of sulphuric acid and also zinc contain traces of arsenic. If there are no stains, the solution suspected to contain arsenic may now be poured into the apparatus through the straight tube, and shaken so as to mix it with the contents of the bottle; a marked change may be observed in the flame if the arsenic is in any quantity. Hydrogen, when liberated by the above process, combines with any arsenic that may be in the solution, and a gaseous compound is formed called arseniuretted hydrogen. If heat is applied to the horizontal tube, the compound is decomposed and the arsenic is deposited on the inside of the tube; or if a piece of porcelain is held in the flame, the metallic arsenic is deposited on it; or if a small vessel be held over the flame, the arsenious acid may be collected in it. All the arsenic may be obtained by passing the gas into a solution of the ammonia-nitrate of silver.

Marsh's test is so extremely delicate that it is said to be capable of detecting arsenic in a solution containing the one-millionth part of it. Antimony in this apparatus gives deposits and stains very similar to arsenic; and as antimony is frequently given as a medicine, it is very necessary to be able to distinguish between them, which may be easily done. Arsenic is more volatile than antimony, and when the horizontal tube is heated, the antimony is deposited in the hottest part, while arsenic is always deposited some distance off. If heat be applied to spots on porcelain, the arsenic volatilizes at a much lower temperature, and gives off the odor of garlic, which antimony does not. If the spots be moistened with hydrosulphate of ammonia, the antimony dissolves immediately, while the arsenic remains nearly unaffected. A solution of the chloride of lime dissolves arsenic, but does not affect antimony.

Another extremely delicate test is that called Reinsch's, and on account of its simplicity is frequently used. It is founded on the circumstance that when one metal that is more electro-positive is placed in a solution of another, the latter metal will be deposited on the surface of the former. If a solution containing arsenic, to which is added a few drops of hydrochloric acid, be boiled in a test tube with some strips of clean copper, the arsenic will be deposited on the surface of the copper; but we must not be deceived by the deposit on the copper; silver, mercury, or antimony would be deposited on the copper by the same process, and resemble arsenic so nearly, it would be difficult to distinguish one from the other without testing; but by drying the copper with a gentle heat, or between folds of tissue paper, then placing them in a glass tube and subjecting them to heat, the arsenic would volatilize while the other metals would not.

To detect arsenic in organized matter several methods have been employed—the first object of all of them is to get the arsenic in solution. This may be done by filtering so as to get the fluid matter separated from the solid, and then acting on the solid with strong sulphuric acid, and heating to drive off the sulphuric acid, when the organic matter will be charred by the acid and left in the form of spongy charcoal. This mass must then be wet with nitric acid, which converts the arsenic, if any be present, into arsenic acid. The mass is again heated to get rid of the nitric acid, when the arsenic acid may be dissolved out with water and filtered to free it from the solid matter. When in a fluid state it can be tested by all the previous tests. The arsenic may also be collected by Reinsch's process, in the following manner: the solid matter is boiled with dilute hydrochloric acid (using about one-tenth of the strong acid) for half an hour, or until it is all broken up; copper in strips may then be introduced, and the boiling continued for some time, when the arsenic will be deposited on the copper, which is then to be dried, placed in a glass tube and heated, when the arsenic will be volatilized and collected, and may be tested by the other reagents.

In regard to the quantity of arsenic in organic matter, he said it was very difficult to determine in the first place when we have it all collected; and then unless there is a sufficient quantity to weigh, it is almost impossible to tell how much was present.

The doctor thanked the members of the Association for their attention, and apologized for occupying their time so long. He stated he had said nothing but what could be found in the books; but as the works that treated the subject in detail were not usually found in dental libraries, he hoped the statements made might be of some benefit.

The doctor's remarks and experiments, which occupied the entire evening, were listened to with profound attention, and at their close a vote of thanks was unanimously tendered him.

A motion to omit the monthly meetings for the coming months of July and August was adopted.

The subject selected for next discussion was—

"MORPHIA AND ITS PREPARATIONS."

THE AMERICAN DENTAL CONVENTION TO BE HELD AT TRENTON FALLS, N. Y.

THE American Dental Convention will hold its Eighth Annual Session at Trenton Falls, N. Y., commencing on Tuesday, the fifth day of August next, at 10 o'clock A.M. You are respectfully and cordially invited to attend.

The Executive Committee reported, at the last Annual Convention, the following Order of Business, and subjects for discussion, for the next Convention:—

ORDER OF BUSINESS.

1. Admission of Members.
2. Reading Minutes of the last Convention.
3. Report of Officers and Committees.
4. Election of Officers.
5. Retiring President's Address.
6. Induction of Officers.

All essays shall be read to open the discussions on the subjects to which they relate.

No member shall speak more than ten minutes, nor more than twice on the same subject, without permission.

I. *Miscellaneous Subjects.*—1. Anæsthetics: their use and relative value. 2. Alveolar Abscess. 3. The causes influencing an abnormal development of the teeth.

II. *Operative Dentistry.*—1. Filling teeth: simple and complicated cavities. 2. The dental pulp: its varied treatment. 3. The extraction of teeth.

III. *Mechanical Dentistry.*—1. Artificial dentures: temporary and permanent.

IV. *Unfinished Business.*

N.B.—The Executive Committee suggests that half an hour every morning be devoted to the presentation of models, improvements, and inventions, and the disposal of business not embodied in the regular order.

W. H. ATKINSON,
G. T. BARKER,
W. B. ROBERTS,
I. J. WETHERBEE,
SAMUEL MALLET,
} *Executive Committee.*

This is a Convention where all regular practicing dentists may unite in the free discussion of subjects relating to, and the full interchange of opinions, experience, and practice of the Science of Dentistry. As associated action is the surest means for advancement, it is hoped that by personal attendance, the contribution of essays, and discussion of the subjects which have been presented by the Executive Committee, you will add to the interest of the Convention, and the elevation and advancement of the profession of Dental Surgery.

B. T. Whitney,
Corresponding Secretary.

REPORT OF THE BROOKLYN DENTAL ASSOCIATION.

At a meeting of the dentists of Brooklyn and New York, June 12th, 1862, it was declared expedient to establish a "Brooklyn Dental Association," after which it was resolved to proceed to the election of officers, which resulted as follows:—

President.—Dr. Wm. C. Parks.
Vice-President.—Dr. A. C. Haws.
Treasurer.—Dr. Jno. Allen.
Secretary.—Dr. Wm. B. Hurd.

It was, on motion, resolved that a committee be appointed to prepare Constitution and By-Laws. Drs. Wm. H. Atkinson and Geo. H. Perine were appointed.

When, on motion, adjourned to meet, June thirteenth, at eight o'clock P.M.

Association met pursuant to adjournment, June thirteenth.

President in the Chair. The Secretary read the minutes of last meeting, which were approved.

The committee on constitution presented a report. On motion, the report was accepted, and it was resolved that it be taken up article by article. After some amendments, it was unanimously adopted as a whole.

It was, on motion of Dr. Hurd,

Resolved, That we now go into an election for delegates to the "American Dental Association," to be held in Cleveland, Ohio, the last Tuesday (29th) in July.

Drs. Wm. H. Atkinson and Geo. H. Perine were chosen, and unanimously elected delegates.

On motion, adjourned to meet, Friday, twentieth of June, at eight o'clock P.M.

Association met pursuant to adjournment. President in the Chair. Minutes read and approved.

Drs. J. S. Latimer and R. W. Varney were unanimously elected members of the Association.

On motion of Dr. Perine, the Secretary was instructed to furnish, together with the officers elect, a synopsis of the transactions of the Association to the dental journals for publication.

After a profitably spent evening in the discussion of various professional subjects, by the different members present, the Association adjourned to meet on Friday evening, June twenty-seventh, at eight o'clock.

Wm. B. Hurd, *Secretary.*

THE AMERICAN DENTAL ASSOCIATION.

The *American Dental Association* will meet in the City of Cleveland, Ohio, upon the last Tuesday of July next, at ten o'clock a.m.

W. Muir Rogers, *Corresponding Secretary.*

EDITORIAL.

GOLD FOIL.

The introduction of sponge gold gave a shock to the practice of dentistry from which it has not yet recovered. It was like a cross wave to a great ship, it shook every plank and every spar. While it did much harm, great good grew out of it. Operators were directed in new ways with a hope of obtaining better results than had attended former exertions. Never in the history of our profession did so great a fallacy receive so large a number of advocates — every line we wrote against it brought a score of writers about our ears—but it fell to the ground after the publication of our article in the April number of the *Dental News Letter* of 1855, in answer to "J. T.'s" review of a former article of ours. It was, perhaps, only a coincident. From that time, however, came into the market a new style of foil, which should supply all the advantages of adhesion of the sponge gold with none of its disadvantages, and to some extent this desirable result has been obtained. Broken-down teeth can be built up, where, if the roots only are firm, to almost any extent or shape. All this, of course, is of the greatest importance to every operator; but, like many other things, with many persons extremes are taken, and it is not strange that those who supply the wants or tastes of customers should also help to increase the difficulty. It is true to some extent, as it has been said by an able writer, that adhesive foil has revolutionized the operations of plugging teeth ; still in that revolution we have lost some important points which it will be hard to regain.

These remarks are not to complain, but to endeavor to hold a steady course between extremes which are liable to occur when any great changes are made in any department of the affairs of life. One of the evils springing from the use of adhesive foil and the sponge gold was, losing sight of the importance of proper *hold* for the more permanent retention of a plug in a tooth. Many operators conceived the idea that if only a portion of the plug was firmly secured, any amount of gold could be added on to such portion *within* a cavity, and the whole plug would be secure, that a plug could be made up of two, three or more sections, and if adhesion was obtained at the time of making the plug it would be necessarily perfect for all time. Now this is a fallacy. If sections be made and adhesion depended upon, and not the shape of the cavity, to hold the plug, the operation is not safe. We will send a specimen of a plug to the office of the DENTAL COSMOS, to illustrate what we mean. Any person calling can examine for himself, or the publisher may send it to whomsoever may require it, and let it be passed around. It is, doubtless, true that if an operation is made of adhesive foil, providing the entire plug is held by the cavity, it is better than a similar operation made with ordinary foil. Adhesive foil is much harder than the non-adhesive, and the anxiety of manufacturers to supply the former has caused a neglect of a careful manufacture of the latter; so that *we old fogies* who still have a longing for the old-fashioned, pliable, and, as has been well said by another, "kid-like" foil cannot obtain it. It seems as though even gold-beaters supposed that their gold must be adhesive; the mass requires it, and the few who do not fancy it must do without. We need not say what advantages it has.

J. D. W.

USE AND ABUSE OF WORDS.

(Concluded from page 608.)

HAVING directed attention to *some* of the defects in the use of language, it becomes proper and necessary, in concluding the subject, to suggest the remedy by which such defects alone can be overcome.

The first step toward such a desirable consummation *is to cultivate a close and intimate acquaintance with the best writers of every age and every tongue;* for judgment is forced upon us by experience, and he that reads many books must compare one opinion with another, and when he compares must necessarily *distinguish*, *reject*, and *prefer*. The daily companionship of good writers, indeed, like good society, has an elevating and refining influence on language; and he who enjoys the advantage of one or both, naturally and insensibly expresses his thoughts in far more appropriate and comprehensive terms than he would under less propitious circumstances.

A comparison between the literary efforts of persons whose minds have not been disciplined by severe study, and the writings of those who, from early childhood, have had every facility placed at their command for obtaining a thorough education, fitting them for any department of life, and who have taken advantage of the opportunities afforded to the fullest extent, present the most conclusive evidence in behalf of the highest order of culture on the part of those who feel called upon to offer their thoughts to the world. He who is not prompted to such action may exercise his own pleasure with regard to engaging in or neglecting self-culture; but if a writer does not desire to create universal disgust, he should not be inferior in attainments, thought, or powers of expression to the mass of those whom he addresses.

It does not follow, however, because one has been denied the scholastic advantages enjoyed by some, that the want of such training cannot, to a great extent, be remedied. Some of the most eminent writers received no regular education, but were entirely indebted for the knowledge they possessed to their own unassisted efforts. *Few persons, indeed, have been taught to any purpose who have not been their own teachers.* Dr. Franklin was a remarkable instance of the fact that a man of superior mind can overcome difficulties that would intimidate the efforts of many. His opportunities were exceedingly limited; he spent a large part of his life surrounded by those who, like himself, were engaged in the daily performance of laborious practical duties, but who, unlike him, had little relish for, and gave still less encouragement to, the cultivation of letters. On an ordinary mind these circumstances would have produced their usual effect of repressing all sorts of intellectual activity; but an understanding like his could not remain in an uncultivated condition; it was an imperative law of his nature that he should, after discharging his daily round of duties, devote the hours wasted by others in frivolity to self-culture, and stimulate others to like efforts.

Such instances, however, cannot be regarded as arguments against systematic education, they only prove what difficulties a strong and determined mind can overcome; and it is fair to infer that if so much was accomplished without a regular education, that still more could have been effected with it. Very few persons, however, have sufficient confidence or perseverance to *recommence* their education. Such objections as, it requires too much exertion; takes too much time; does not pay; interferes too much with ease and pleasure; it is impossible, etc., are urged, and men naturally idle satisfy themselves and intimidate the industry of others by calling that *impossible* which is only *difficult.*

Even those who enter upon such an undertaking with the greatest ardor, and the firmest determination, are liable to be insensibly drawn off from their self-appointed duty by external influences. For a time rapid progress is made, and the person becomes conscious of powers equal to the emergency, and naturally supposes that as much as has been done to-day may be accomplished to-morrow; but on the morrow some difficulty arises, or external influences prevent. Indolence, interruption, business, and pleasure, all take their turn in retarding the progress of such a work, and it is eventually abandoned on account of a thousand opposing causes that can, and ten thousand that cannot be recounted.

Such a work cannot be effected in a day, a week, a month, or a year; but it must be the prolonged effort of a lifetime. To be continuous and successful, it must be spontaneous to a great extent. It does not require the sacrifice of all ease and pleasure, but demands steady and unflinching perseverance, devotion, and concentration of purpose to take advantage of the odd moments that occur with every one, and which the mass of the world regard as time that they know not what to do with.

Intimacy with good writers has been suggested as means for self-culture, and to this end prescribed courses of reading, pointing out the books to be read, and the order of proceeding with them have frequently been laid down. Now while this external guidance, to a certain extent, may be useful, an elaborately-prescribed course would be found neither desirable nor practicable. It does not give free enough scope to choice, and an independent mind sooner or later would break away from the best course that possibly could be devised—for communion with books, to be intelligent, must be more or less spontaneous.

One who attempts to contribute regularly to the literature of his profession should, of course, be perfectly familiar with the literature of his calling, and the collateral *sciences*. But this is not enough. The writer who aims to do justice to his profession, and the subjects that he may attempt to elucidate, must cultivate an acquaintance with every department of letters—history, biography, poetry, logic, natural philosophy, etc.—if he desires to secure that command of language and copiousness of illustration which is ever the peculiar characteristic of the educated mind.

There are persons *in* and *out* of professions who affect a contempt for books, and, as they facetiously call them, "book-worms;" and some even who take the pen in hand pretend that they are under no obligations to such sources for their knowledge. Such persons may succeed in deceiving those who know no better, and in some instances even deceive themselves; but they cannot blind those who are familiar with the records of science and the general field of letters.

The best minds the world has ever seen, men of thought and of action, had too much good sense to contemn books. Plato, Cæsar, Bacon, Shakspeare, Franklin, Goethe, Napoleon, and hosts of other great names too numerous to mention, were well-read, universally-educated men. Bacon, one of the most practical men that ever lived, truly wrote:—

"Crafty men contemn studies, simple men admire them, and wise men use them, *for they teach not their own use; that is a wisdom without, and won by observation.* Read not to *contradict*, nor to *believe*, but to *weigh* and *consider*. Some books are to be *tasted*, others to be *swal-*

lowed, and some few to be *chewed* and *digested*. Reading maketh a full man; conference, a ready man; and writing, an exact man. And therefore, if a man write little, he had need have a great memory; if he confer little, have a present wit; *and if he read little, have much cunning to seem to know that he doth not*. Histories make men wise; poetry, witty; the mathematics, subtile; natural philosophy, deep; morals, grave; logic and rhetoric, able to contend." It will hardly be denied that this passage deserves to be thoroughly "*chewed* and *digested*."

The true student neither neglects the observations of others, nor blindly submits to the mere authority of celebrated names, nor thinks so highly of self as to imagine that no light can be received from books, nor so meanly as to believe that nothing can be discovered but what is to be learned from them. Ever attentive, ever desiring more light, he endeavors to learn from every person or thing he comes in contact with. The wise and foolish, the great and small, every object in nature, each and all in turn contribute to the education of one who has

"Attentive and believing faculties."

That one may not, however, ascribe to himself the credit of discoveries long since made by others, or weary his attention with experiments of which the results are universally known, that he may start where others have had their progress arrested, and that he may keep even with the additions in his own age, he must be content to learn from books the existing state of knowledge.

Again, he who writes constantly and makes no addition to the stock of knowledge with which he entered upon his course, by original observation, intercourse with books or his fellows, must sooner or later exhaust the supply and be compelled to suspend his labors, or favor his readers with repeated rehashes of former contributions—and can only be compared to a well of water unsupplied by a spring, in which evaporation and the bucket eventually draw off the contents.

As Sydney Smith said: "Nothing will do in the pursuit of knowledge but the blackest ingratitude. The moment we have got up the ladder, we must kick it down; as soon as we have passed over the bridge, we must let it rot; when we have got on the shoulders of the ancients, we must look over their heads. The man who forgets the friends of his childhood in real life, is base; but he who clings to the props of his childhood in literature, must be content to remain as ignorant as he was when a child."

To acquire knowledge is one thing; to present it in a clear and comprehensive manner to others is an entirely different one—for books cannot teach the use of books. A man may be a perfect walking enclycopedia, familiar with every variety of human knowledge, and every mode of expression, and yet be unable to benefit the world one jot, as a writer, from the fact that he has not trained himself by long-continued practice to the difficult art of composition. Indeed, the most exact use of the medium, language, by which man holds communion with his fellow-man, is inadequate to convey the plainest thought *exactly* as it is in the mind of the writer. It can only be what it really is, *suggestive*, in the hands of the best. What must it be then in the hands of those who make no effort to cultivate an extended acquaintance with it!

There is a general impression that to write easily and fluently is no difficult matter, and, particularly, that those passages which have charmed the world generally, on account of their truthfulness and felicity of expression, have been thrown off with little or no effort. Let such persons make the attempt themselves, and they will become better judges; or, turn to the records of the past, and there find what a rigid discipline those whose productions have been handed down from age to age subjected themselves to. The cotemporaries of Demosthenes who envied him, complained that his productions smelt too much of the lamp, and yet the labor he spent on his orations gave him, when he spoke, that powerful influence over his fellows, and makes his productions, even now, models for study. Tully says that "he satisfied everybody but himself." In the "Curiosities of Literature" there is presented the rough draft of one of the most beautiful passages in Pope's translation of the Iliad. The lines are in Pope's handwriting, along with his numerous corrections, and the lines which seem to the reader to have been struck off at a single happy stroke, are proved to have been touched and retouched with the indefatigable attention of an exact writer. Buffon says that he wrote his "Epoques de la Nature" over eighteen times before he could satisfy himself.

Instance upon instance could be presented in support of the fact that all good writers have fully recognized that to secure an approximation to an *exact* description of things, or expression of thought, it is necessary "to labor and to wait." No one appears to have been more thoroughly conscious of this than Franklin. His practical common sense early recognized the difficulty, and he recommended the study of poetry and the writing of verses for this very purpose. He set himself manfully at work to overcome his defects, and tells us that early in life he met with an "odd volume of the Spectator, and was so much delighted with it that he read it over and over. He thought the writing excellent, and wished, if possible, to imitate it; and with that view took some of the papers, and, making short hints of the sentiments in each sentence, laid them by for a few days, and then, without looking at the book, tried to complete the papers again by expressing each hinted sentiment at length, and as fully as it had been expressed before, in suitable words that should occur to him; then compared *his* Spectator with the original, discovered some of his faults and corrected them, but found the want of a stock of words, or a readiness in recollecting and using them, which he thought he should have acquired before that time, had he gone on making verses, since the continual search for words of the same import, but of different length to suit the measure, or of different sound for the rhyme, would have laid him under a constant necessity of searching for variety, and also have tended to fix that variety in the mind, and made him master of it. Therefore, he took some of the tales in the Spectator and turned them into verse, and after a time, when he had pretty well forgotten the prose, turned them back again."

Who will pretend to say that time was wasted, when the most practical, philosophic, and philanthropic mind that our country has produced was laying the foundation that eventually enabled him to present his thoughts and describe his discoveries in such a clear and comprehensive manner, that he is regarded as one of the purest writers in the English language? Who can fully appreciate the inestimable service such writers as Addison, Johnson, Goldsmith, Franklin, and Irving have conferred on those writers who, desiring to explain their thoughts in the *plainest* manner possible, endeavor to "draw from the pure well of English undefiled?"

With the facts already referred to, we feel justified in saying that he who believes himself called upon to publish his thoughts, cannot be too careful with regard to the medium employed, if he desires to be comprehended by others; to accomplish this, he must subject himself to the rigid discipline that the best minds have submitted to, and then publish only when convinced he has *something* to publish, caring not for the reward that may follow, but only for the *truth* of his publication. By constant, unremitted practice, the capability of expression will become more easy and the sphere of usefulness more expanded.

One great fault in writers, as with every one else, is to be constantly deferring the performance of duties. They have, however, this just excuse, that one cannot write at all times. In place of waiting until a sufficient length of time can be obtained to enter upon and finish a given subject, it is far better to jot down the results of experiments, observations and ideas when first presented to the mind. By placing them on record, they can be readily used when wanted; but if this is neglected, they may escape the memory and never be recalled. With this object in view, it is well to have the necessary appliances always at hand—a lead-pencil, and small portfolio just large enough to hold a few gold-leaf books, to be carried in the pocket, are all that is demanded; and with these, whether at home or abroad, walking in the country or traveling in steamboat or cars, the objects presented, and the thoughts which come to every one, but are so often unattended to, can be preserved.

One thing in particular should ever be borne in remembrance, that in advancing views which possibly may be disputed, it is better to avoid, in writing, the employment of positive assertions. Nothing, perhaps, has tended more to retard the progress of science, and provoke *personal* discussions, than the positiveness of pseudo-scientific men. A certain view is advanced as unquestionable by one; it is objected to by another with equal pertinacity. The first, on the principle that—

> "To observations which ourselves we make,
> We grow more partial for the observer's sake,"

responds, and feeling aggrieved that any one should have the presumption to object to his opinions, becomes personal; crimination provokes recrimination, and the parties, eventually losing sight entirely of the subject, endeavor to make themselves as ridiculous as possible on paper, to the amusement of some, the pity of others, and the contempt of all. By offering even that which we feel pretty well assured is unquestionable in a *suggestive* manner, it is less likely to provoke opposition, and may win ready adoption; and if it should prove untenable, one is spared the mortification and humiliation that attend the complete retraction of a positive assertion. Surely a plan practiced with such happy success by Socrates is not unworthy of adoption.

In conclusion, recognizing that some men are intractable and others incurable, we cannot expect that this communication will prove of much advantage to such minds; but those who, like ourself, recognize that they are under the deepest obligation to institute a thorough self-examination, and eradicate, as far as possible, every defect that shall tend to contract the sphere of usefulness, must feel bound to enter upon and continue that work.

Addressed as this communication is particularly to the young minds of the profession, if but one of the number should devote himself earnestly and continuously to self-culture as the result of its perusal, it will not have been written in vain. J. H. M'Q.

DR. JAMES ROBINSON.

In a recent number of this magazine our English correspondent presented a brief account of the fatal accident by which the life of this eminent and valuable member of the profession was suddenly brought to a close, in the midst of a wide and extended sphere of usefulness.

According to the description of one who appears to have known him intimately, the editor of the *Dental Review*, "he belonged to a class, who not only labor with their hands, but whose brains create work for their hands to do. Always employed, however much such men accomplish, they are constantly seeking after something greater, and no sooner is one object fulfilled than new projects take the place of those which previously engaged attention." Again: "One naturally inquires what were the mental and physical endowments of the individual which enable him to accomplish in a comparatively short space of time what so many fail to perform in a lifetime? Great activity, great energy, and entire devotion to the work in hand were among the marked traits of Mr. Robinson's character."

These few words contain the secret of every man's success who accomplishes anything in this world; for ability combined with concentration of purpose, and an indisposition to be drawn off from the faithful discharge of acknowledged duties by the allurements of ease or pleasure, can readily accomplish that which to many appears impossible.

The esteem in which the services of Dr. Robinson are held by his intimate associates may be inferred from the favorable comments which accompany the notice of his death. And the accompanying sketch of his life in the Review department, no doubt will be read with interest by his friends on this side of the Atlantic.

There is a natural and universal desire, on the part of the world, to know something of the history of those whose labors have benefited their fellows, or commanded their respect and admiration; to ascertain what difficulties they had to contend with in the arduous task of struggling for existence and self-culture; to know what manner of men they were, what they had to work on, and to live on. Truly, "the proper study of mankind is man;" and while it is as rare to meet with a well-written life as to read of a well-spent one, there is no kind of reading more instructive or beneficial for young and old than biography—tending, as it does, to protect one from low and groveling desires, and stimulating to high and noble aims. It teaches also, in the most forcible manner, that all men are mortal, and that the wisest and best have all the weakness of poor frail humanity, and is therefore calculated to induce a large charity for the shortcomings of those with whom we are daily brought in contact, in the pursuit of business or pleasure.

In the language of Carlyle: "A scientific interest inspires us in this matter, because every mortal has a problem of existence set before him, which, were it only, what for the most it is, the problem of keeping soul and body together, must be, to a certain extent, *original*, unlike every other; and yet, at the same time, so *like* every other; like our own, therefore, instructive, moreover since we are indentured to *live*."

While the quiet and methodical life of a professional man, as a general thing, has little if any of those boldly-marked epochs which illustrate the career of those who command universal attention, and make their biographies attractive reading, instruction and profit can be derived from the perusal of such a sketch as the one referred to. J. H. M'Q.

AMERICAN DENTAL ASSOCIATION.

It will be observed by the notice of the Corresponding Secretary, that the next meeting of this association will be held at Cleveland, in the latter part of July. While the attendance on the part of the delegates from the Western States no doubt will be large, it is more than probable that the disturbed condition of the country, and other causes, will tend to make the representation from the Eastern States quite limited. This, however, need not prevent the various committees from making their reports. These can and should be prepared and forwarded to the Corresponding Secretary when the different members constituting the committees find that it will be utterly impossible for them to be present. In this way, although the presence of the members at the meeting would be more desirable, the duty imposed at least can be fully discharged.

J. H. M'Q.

OBITUARY.

It is with great regret I announce to you the sudden death, on the seventh instant, of Carnie C. Franklin, of New York, eldest son of Dr. B. W. Franklin, the well-known, able, and indefatigable agent of the American Hard Rubber Company; also editor of the *Vulcanite.* Mr. Franklin was born in September, 1837, and was, therefore, in his twenty-fifth year at the time of his death. In 1856, associated with his father, he established the first and only dental laboratory for the manufacture of the continuous gum or Allen work in the United States. He continued in the business until his father's appointment to the agency above mentioned, when he associated himself with Mr. J. C. Sproul, with whom he remained connected, in a lucrative and rapidly extending business, until the day of his death.

Mr. Franklin was a genial, open-hearted young man, industrious and energetic, and promised to have become a worthy member of society and of his profession. His death, so sudden and in the early spring of his manhood, will be deeply regretted by his many friends.

G. H. P.

PUBLISHER'S NOTICE.

This number completes the third volume of the Dental Cosmos Its publication will be continued as heretofore, and every effort will be made to increase its usefulness. The first number of the fourth volume will be issued in the early part of August. Those desiring to subscribe, will confer a favor by sending their subscriptions immediately, as we shall adhere to the rule of requiring payment in advance.

To every one who will send *five dollars,* either in payment of two subscriptions (one of which shall be new) or of a subscription for two years, we will send a copy of the *Dentist's Pocket Diary and Appointment-Book* for 1862–1863.

Voluntary correspondence solicited from all parts of the world. When used, it will be paid for.

REVIEW OF DENTAL LITERATURE AND ART.*

BY J. H. M'QUILLEN, D.D.S.

DENTAL REVIEW, LONDON—MARCH.

"COLLEGE OF DENTISTS OF ENGLAND.—Monthly Meeting, Tuesday, February 4th, 1862. H. T. Kempton, Esq., F.L.S., in the Chair. Mr. Stocken, in presenting to the museum a skull and some teeth, which had been found near Holyhead, made the following remarks :—

"In the course of Mr. Hulme's interesting and instructive lectures on Dental Surgery, the subject of Irregular Dentition came before the class. He mentioned (as most of us are aware) the fact that the canine teeth are most frequently the subjects of irregularity, and at times they are not evolved at all.

"This skull, which I chanced to have in my possession, clearly illustrates this anomaly; the canine is fully developed, but remains completely imbedded in the bone; by the removal of the lateral incisor it is plainly seen; it will be further observed, it lies almost transversely to the other teeth in rather an exceptional position.

"I mentioned these facts to Mr. Hulme, who appeared to think the specimen an acquisition to the museum. Under these circumstances, I have felt great pleasure in presenting it to the college.

"With your permission I will mention a few circumstances connected with this skull and some others. About two miles southeast of Holyhead is a place called 'Towen Capell,' where these skulls or rather skeletons are found. I am informed that 'Towen Capell' translated means 'Chapel on the Sands, or Burial Place on the Sands;' from this we should infer the locality had been used as a burial place; some, however, say the name has been applied to the place in consequence of skeletons being found there. They are always met with lying in pairs, their heads toward the east, and a few white stones under or above the head, which are not found elsewhere. A head and foot stone is also found supporting another above, the sides being left open; no vestiges of coffins are to be met with.

"Some suppose the locality to have been the site of a battle between the Romans and Britons; but no implements of war are to be found, and for this and other reasons I think the supposition is erroneous. Some Druidical remains are to be seen about half a mile from the spot."

* * * * * * *

"The discussion announced at the last meeting for this occasion was then opened with a few preliminary remarks by Mr. Henry, which were as follows :—

"He said, as all present were aware, the subject, 'Dental Caries,' was to be discussed, in continuation of his paper read at their last Monthly Meeting. He begged they would bear in mind, the object of the paper was not so much to impart new matter as to form a basis for discussion. With this intention, he had placed before them the existing theories as to the nature and origin of dental caries as concisely as possible. Many arguments advanced by different authors in defense of individual theories, had of necessity been omitted; but he trusted sufficient was said to show

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* Owing to a press of matter, we are compelled to leave out a portion of the *Reviews* intended for this month's publication.

how untenable is any other than the chemical theory, which, if accepted, he believed would most satisfactorily explain all the features in the process of the disease itself, while coincident phenomena, brought about by vital forces, should be regarded, *per se*, as not necessary to the existence of dental caries, but solely as the *results* of morbid influence. He would not trespass on the limited time at their disposal with any further remarks; he would only add that in leaving the subject with them, he should listen to the ensuing discussion with great interest, reserving his defense until all their evidence was taken, with the full intention of relinquishing any views he might have advanced, providing he was convinced they were untenable.

"The discussion was commenced by Mr. Rymer, who regretted that he had not had an opportunity of perusing Mr. Henry's paper; he referred the members to a discussion held in America some time back on the subject of Caries, and which was fully reported in the first volume of the *Quarterly Journal of Dental Science*. The report contained some *valuable* remarks on the subject. From his own experience, he quite agreed with the chemical theory; but at the same time, he would urge students to investigate for themselves, and to bear in mind that in pursuing their research on this important subject, the grand purport is to facilitate our efforts in preventing and arresting the disease.

"Mr. Perkins considered the imperfect formation of the enamel a frequent cause of decay, by food collecting in the interstices and decomposing; and that without chemical action teeth would not decay at all, however predisposed they might be.

"Mr. Hulme observed that the causes of caries may be divided into two kinds—the exciting and the predisposing. It was still a question not fully decided, whether the dentine does not lose its vitality, or have it impaired, before it is attacked by caries. It was quite certain that after severe attacks of illness, teeth which were previously healthy often passed into a rapid state of decay. The tooth disease not having been produced by the use of medicines, but apparently arising in consequence of constitutional causes. The coloring of the teeth in jaundice, the reddening of the teeth, and the changes of color which may be noticed from day to day in them, vary with the state of the health, and seem to prove that internal changes are constantly taking place quite independent of external agents. It would be very desirable to obtain a careful analysis of teeth attacked by caries, in order to see whether there was any correspondence between the amount of inorganic matter present, and the nature and character of the caries. Another point which remained undecided, was the nature of the acid or acids which acted on the teeth. Mr. Bridgeman had lately argued that the acid was the lactic. His theory was, however, supported rather by speculative views than chemical evidence. These and many other points still remained to be cleared up before the subject of caries could be properly investigated.

"Mr. Kempton considered the idea of endosmosis as a cause of caries, as suggested by Mr. Lintott, was not sustainable; for to have endosmosis, it is requisite to have a porous septum and two fluids of different characters on each side. But there is no proof that the enamel would act as such a septum; nor in the tooth, as it it placed, is there any probability of two fluids being so arranged in relation to this septum as to cause the transference of any current of the osmotic kind. He had understood Mr. Henry to say that beyond nerve supply, there is no vitality in dentine, but it is quite problematical that the dentine is supplied with nerve; for Mr.

Tomes has not proved that the fibrils of the dentinal tubes are of the same structure as nerves, or have any connections with the nerves of the part. Further, it is quite certain that nerve alone is not sufficient for the manifestation of vitality. The nerves only govern the nutrition, even of the soft parts; the blood supplies the nutrition: consequently it is to be inferred that there is supplied by the blood a pabulum for the support of the dentine the same as in every other structure of the body. What are vessels for otherwise?

"Mr. Williams was in favor of Mr. Robertson's theory that the general cause of caries was the corrosive action of decayed particles of food, or what had now been spoken of as the chemical theory. If this was not the cause in most cases, why did not teeth decay after they had been effectually stopped?—a circumstance which seldom happened.

"Mr. Henry, in replying, observed that the fact of teeth, apparently predisposed to become diseased, being often retained for a long period intact in persons of good health, and who were very careful and cleanly, was one which demanded a further investigation in a chemical point of view. With regard to the action of carious teeth on their neighbors, spoken of by Mr. Perkins, he believed that a sound tooth, not previously acted on by lateral pressure, would not be injured from the mere fact of its neighbor being diseased any more than other teeth in the vicinity, which, however, would be equally affected with the proximate tooth by a vitiated condition of the saliva. He regarded lateral pressure, on which opinion seemed to be very much divided, as an exciting cause of caries, but only in cases where the enamel was imperfectly developed; and he thought that the cast exhibited by Mr. Kempton, in which the crown of a bicuspid was half destroyed through want of room for its eruptions, went far to confirm his opinion. The question of loss of vitality preceding dental caries was still considered probable by Mr. Hulme. He (Mr. Henry) could not think this to be the case, and regarded the fact of a tooth living and retaining its normal appearance after the pulp had been removed and the cavity filled as somewhat conclusive, for the pulp must be the source of any vital change in a tooth; and he believed that in a tooth so filled all possibility of such vital change was cut off, and the tooth quite liable to be reattacked by caries from without, though he could not say he had met with any case to illustrate his opinion. Mr. Henry was pleased to meet with so general a support of the chemical theory, and begged to express his thanks to the members.

"Mr. Kempton thought that the evening's discussion had produced the following results, viz., that the causes of caries were generally thought to be external, although these may be helped by constitutional weakness, leading to faulty deposit of enamel. That the external causes are, chemical agents acting on the enamel, and accidents, such as expansion from sudden elevation of heat, external pressure, etc. etc.; but thought, in order to learn, we had better begin our investigations again as though nothing had yet been done, and if all were to investigate, some more light might be thrown on this interesting subject."

THE DENTAL REVIEW, LONDON—APRIL.

"OBITUARY.—*James Robinson, Esq.*—The proverbial uncertainty of life has, perhaps, seldom been more sadly exemplified than in the case of the late Mr. Robinson. Our readers have learned from the columns of the public press the main particulars relating to his lamented death: that while walking in the garden of his suburban residence, Kenton, near Harrow, a stray branch attracted his attention, and he proceeded to sever it. The instrument (a new pruning-knife) cut suddenly through, and, from the force of the stroke, penetrated his left thigh, about two inches above the knee. There was scarcely any hæmorrhage at the time; and although Mr. Robinson was at first afraid that the main artery was wounded, after applying a little plaster and binding the limb round with a pocket-handkerchief, his anxiety abated, and he thought little more of it. His wife persuaded him, however, to go to bed, and immediately, without Mr. Robinson's knowledge, sent for medical aid, not judging the wound to be a serious one, but simply for satisfaction's sake. On the arrival of Messrs. Bridgewater from Harrow, Mr. Robinson had lost so much blood that they found him in a state of collapse, from which he never rallied, but gradually became weaker and weaker, and finally sunk from pure exhaustion at 12.30 A.M. on Tuesday morning.

"Mr. Robinson has occupied for many years so prominent a position in the profession, both as a practitioner and as a reformer, that a sketch of his career, however brief, will be read with interest. That this should not be more ample in detail, is attributable to the difficulty of obtaining the necessary information in the short space of time at our disposal.

"James Robinson was the youngest son of the late Captain Charles Robinson, R.N., who was for several years one of the commanders of Greenwich Hospital. He was a native of Hampshire, and was born on the 22d of November, 1813, consequently he was forty-eight years of age at the time of his death. From an early period, energy and activity gave indication of the perseverance and enterprise which were characteristic of maturity. At fourteen years old he was articled to a surgeon and chemist in London, and at the close of his indentures entered himself at Guy's Hospital, and the London University, where he pursued his studies with considerable ardor, and devoting especial attention to the structure and diseases of the teeth. In 1830 he commenced business in Store Street, Bedford Square, we have been given to understand, as a chemist. His predilections, however, quickly led him to adopt the branch of practice to which he had given so much attention, and his dexterity as a dentist soon became known. By strict attention to the duties of his practice, the latter gradually extended. In 1834 he received the appointment of Surgeon-Dentist to the Metropolitan Hospital, (now the Royal Free Hospital,) and from this period dates his remarkable success in his profession. In 1840 he removed to Gower Street, Bedford Square, and it was here that he first introduced the use of anæsthetic agents, in the year 1846, in dental surgery. The introduction of these agents added considerably to Mr. Robinson's reputation, and his practice became one of the most extensive in this country, and it so remained to the time of his death. Notwithstanding that the duties of his practice involved an immense amount of personal labor, (his regular professional hours were from nine to five or six,) Mr. Robinson considered it incumbent on him to exert himself toward elevating the profession of which he was so active a member, by means of organized education and association. In 1842 he did his best to establish a dental society; but the wretched jealousies of the many, and the apathy of nearly all, rendered his exertions abortive. His contributions to the literature of the profession were very useful and numerous, most of them being published anonymously. His work, entitled 'Robinson on the Teeth,' is well known, and had an extensive circulation. Among his articles furnished to American and other periodicals, may be mentioned that 'On Filling the Teeth,' contributed in 1845.

'Observations upon the Importance and Value of a Knowledge of the Collateral Branches of Medicine and Surgery,' contributed in 1847. 'The History of Dental Surgery,' contributed in 1845, etc. For some years prior to his death, he was engaged in compiling a more extensive work on Dental Surgery and Mechanics—this will probably appear ere long, as we understand it is nearly completed.

"On the 13th of July, 1849, Mr. Robinson received the appointment of Surgeon-Dentist to H. R. H. Prince Albert.

"The attainments and position of Mr. Robinson attracted the attention of the authorities of the Baltimore College of Dental Surgeons, who, in the year 1846, on March 8th, conferred upon him the honorary degree of Doctor of Dental Surgery.

"Such is a brief review of Mr. Robinson's life, with the exception of the leading part taken by him in the great dental reformatory movement publicly commenced in 1856. It is not now necessary to recapitulate particulars which are amply recorded in the pages of this journal, and in those of its predecessor, the *Quarterly Journal of Dental Science;* suffice it to say, he was unanimously elected first President of the College of Dentists, in November, 1856. This post he filled with ability and success until the unfortunate differences which sprung up in 1858, on the amalgamation question. On this question he no doubt acted, as he thought, for the best, but his judgment was probably more at fault here than on any other occasion. The terms of amalgamation having been rejected by the majority at a special meeting of the members, Mr. Robinson resigned the presidency. We have very good reason to believe that he looked back on this period with deep regret, when time had disclosed to him the fact, that the supporters of the College of Dentists (in its own *name* according to the distinct arrangement of the original delegates from the College, and from the Odontological Society,) were right, and that he had failed to perceive an influence over his own free will. Thus in 1860, on a vacancy occurring in the treasurership it was offered to him and he readily accepted it. From this time his interest in the cause of independent action, as represented by the college, was warmly evinced, and every possible reparation was made toward counteracting the effects of any injury sustained by the college from his resignation of the presidency.

"During the past year, Mr. Robinson exerted all his energies in founding the National Dental Hospital. In this he was successful, and shortly before his death witnessed the opening of the hospital in Great Portland Street, and received the acknowledgments of its supporters, according to his due—as *the founder.* We believe the last meeting of any kind attended by him, was that of the committee of this hospital, on the Thursday evening before his decease.

"In character, as before observed, Mr. Robinson was most energetic. He was also of a kindly, social disposition, and many are those in the profession who can testify to his cheerful and liberal hospitality. The loss of Mr. Robinson is a great one to the profession. Those with whom he was publicly associated paid him a last tribute of respect by officially attending his funeral at Highgate Cemetery, on the eleventh March ult. The melancholy occasion witnessed the Council of the College of Dentists, and the Committee of the National Dental Hospital, meeting in this melancholy ceremony with his numerous other professional and private friends. Of those present, none, we feel convinced, will forget the solemnity attending the funeral."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Organic Development.—In the course of a very able introductory address on physiology, delivered in the Medical School of St. Bartholomew's Hospital, London, and published in the *Lancet*, MR. WILLIAM SAVORY gives the following excellent epitome of this subject:—

"In a general survey of the animal kingdom we recognize a vast difference in the grade of development of its various members. Independently of types, we find the utmost diversity in the elaboration and specialization—or, to use a modern phrase, differentiation—of structures and functions; in a word, in the variety of organs and the consequent complexity of the animal. Nay, more, within each type we find great extremes in the grade of development, a fact which at once shows the impossibility of arranging the members of the animal kingdom in a simple, consecutive, and inclusive series, an idea which has been for some time abandoned, but which existed long enough to produce such theories as those of 'arrest of development' and 'retrograde metamorphosis.'

"Therefore, in the study of any living being, these two great questions present themselves: its type of organization; its grade of development. They are absolutely distinct, and must be clearly distinguished. This has been long since forcibly laid down by the philosophic Von Baer. He has admirably shown that neither its type of organization nor its grade of development alone suffices to characterize any living being; for under the same type very different grades of development are presented, while conversely a like grade of development may be attained under different types. The type and the grade together determine the special form. And this applies not only to the entire plant or animal, but to each system and organ; for it is not more possible to follow any through one uninterrupted progression, than it is to arrange either kingdom in a single linear series.

"The whole matter may be epitomized thus:—

"The PLAN of development—from the general to the special.

"The TYPE—the *direction* which development takes.

"The GRADE—the *degree* to which development proceeds.

"But in the midst of all the vast variety hence ensuing, is there nothing in common save in the earliest germ? Is there no unity of organization beyond this? Yes, assuredly. Beneath all complexity and diversity we can discover a fundamental unity of structure—a unity of plan in the means by which the essential portion of the several functions is performed. Wherever you find certain functions discharged at all, you find them discharged everywhere in a similar manner and by structures essentially the same; although, in consequence of the extent to which the essential parts of organs become veiled and obscured in the course of their development and adaptation to special purposes by the introduction of accessory parts, this fundamental unity of plan is more generally obvious in the end or result—that is, in the function—than the essential means—the structure.

"It may be laid down, that throughout the whole animated creation the essential characters of the organs and functions which all possess in common, are everywhere the same, although they are, under different circumstances, infinitely modified and varied. Thus there is unity in the essential characters of organs, and in the essential nature of their functions, wherever they are found. As in chemistry there are compounds innumerable exhibiting all degrees of complexity, yet in their construction conformable to certain types, and composed of the same essential elements, so amid the multitudinous products of types of organization and grades of development we recognize organs and functions which, in their essential nature, are throughout the same.

"It will be my purpose to develop hereafter, so far as I am able, these grand principles: to trace the functions from their earliest and simplest to their most advanced and elaborate condition, and to endeavor to demonstrate that, while the history of each is one of gradually increasing complexity, while completeness of execution is attained by division of labor, nevertheless the essential nature of each, and the means by which it is performed, remain throughout the same. For this is of the first and highest importance to the physiologist. If it were not for this identity of structure and function throughout, amid divers types and grades innumerable, no sound or secure conclusion could be drawn from comparative research. As it is, these endless varieties and modifications are but different aspects and illustrations of the selfsame thing. Thus by comparative research is the best and largest insight gained of human physiology.

"I cannot, I need not, now enter further upon this subject—so beautiful, so fascinating—in which absolutely so much, comparatively so little, is known. It is enough for the present to have called your attention to it. I repeat, it is of surpassing importance to us; for upon this basis are constructed the largest and grandest truths of physiology, and some of the most difficult problems have been solved by the evidence which comparative physiology affords. In fact, any conclusion which will not stand the test of this inquiry, is of no value, and falls to the ground."

Phosphor-Necrosis.—In the clinical record of St. Bartholomew's Hospital, in the *Med. Times and Gaz.*, it is stated that "MR. PAGET spoke on the subject of phosphorus necrosis of the jaws, in reference to two cases then under his care—one of the upper and another of the lower jaw. He first read Mr. Vernon's report of the case of necrosis of the lower jaw. The patient was twenty years of age. He was admitted at first, under Mr. Stanley's care, in November, 1860. Except for the disease for which he was admitted, and which began three months before admission, he had generally had good health. His occupation was that of a wax vesta maker. The first symptom he had was toothache. The tooth was drawn, with relief to the pain; but a week later a small piece of bone become bare, and the disease then, without pain, extended rapidly, the teeth of the lower jaw becoming loose. When admitted, his face was swollen and œdematous-looking; his teeth loose, and there was a profuse purulent discharge. The patient was a long time in the hospital, was well fed and cared for, but the operation was deferred, as he had disease of the aortic valve. It was not considered wise to give him chloroform, and it was doubtful whether he could bear so severe an operation without it. In this opinion Mr. Paget then agreed; but as the man had not materially improved, and as the patient was evidently suffering very much, it became a question whether it would not be well even to run the risk of chloroform. Mr. Paget, therefore, a few weeks ago, operated. He removed the whole of one-half, and a considerable part of the other.

"The next case, reported by Mr. Southam, was one of singular interest, from the unusual manner in which the exposure to the fumes had taken place. The patient was a man aged thirty-four, whose business did not in any way bring him in contact with phosphorus. He had never had syphilis, had not taken mercury, and had, until his present illness, always been healthy, except that he had suffered much from 'nervousness.' He had, it seems, attended some popular lectures on nervousness, and heard that phosphorus was 'good for the nerves.' He was told at the same time how to prepare it. He was to distill phosphorus into a jar of water. He did this very assiduously, and was in consequence very much exposed to the fumes of phosphorous acid. After three or four months the first symptom, toothache, appeared. One tooth was drawn, and he soon after had a discharge from the socket. He soon lost all the teeth in his upper jaw, and had discharge from all the sockets. On the appearance of this symptom he took the phosphorus solution more assiduously than ever. He was admitted, under Mr. Paget's care, in November last. He then had profuse discharge, much swelling of the face, separation of the mucous membrane of the jaws and palate, and great loss of health. There was then no healthy boundary to the necrosis, and he was therefore persuaded to leave the hospital for a time, in order that the dead bone might be more completely separated. He has recently returned with the change anticipated, the right upper jaw being quite loose, and the left nearly so.

"In this case there was a special interest in the fact that it was an exception to the almost absolute rule that the disease only occurred in lucifer-match makers. Lucifer-match makers were hard worked and were kept in a bad atmosphere, and to this, and not to the phosphorus, some had attributed the disease. Any one long enough exposed to the fumes of phosphorus suffered from necrosis of one or both jaws, and the majority employed in the manufactories suffered at one time or another from this disease. But there were certain conditions which were necessary before a person became liable to suffer. So long as the mucous membrane was intact, and the teeth sound, there was no mischief. This had been carefully ascertained, and was quite certain. In one of the large German manufactories it had been found that if the workmen had broken or decayed teeth, gumboils, or anything which bared the periosteum, they became liable to suffer, and this was confirmed by experiments on animals. It was found that if healthy rabbits were kept in a chamber into which the phosphorus fumes were admitted, no disease of the jaws followed. If, however, their teeth were broken, or if in any way the periosteum were exposed, then they began to suffer. Thus, then, it may be accepted as a well-ascertained fact, that unless the phosphorus fumes come in contact with the periosteum, the disease is not produced.

"The manner in which the fumes produce necrosis is also singular, unlike other caustics, as for instance nitric acid. It does not act merely locally, destroying what it touches, but it seems to affect more or less the neighboring bone—part of it, or, in time, the whole of it. There is no other substance which, when locally applied, seems to produce results over so large a space. Not unfrequently it would thus destroy the whole bone attacked, beginning first at a single point of bared periosteum, as the socket of a tooth after extraction. In this peculiarity of action, it appears to resemble less a mineral than an organic poison.

"So far as has been at present ascertained, no bones except those of the upper and lower jaw have been attacked. Although of course, now and then, there must have been, as from accidental strumous disease, exposure of other bones to the fumes. The contiguous nasal bones never suffered, at least not primarily, but sometimes as a sequence to disease of the jaw bones. This curious choosing of certain structures shows that these bones have distinctive peculiarities, for which, by comparison of their texture with other bones, we cannot yet account. It was just as difficult to tell why mercury should affect the jaws more than other bones. It is the more difficult to explain why these bones should suffer from mercury and phosphorous acid, as they are not liable to be affected by organic diseases, as syphilis or gout.

"In reference to the way in which the necrosis was brought about, Mr. Paget said that inflammation of the periosteum was the first step. He showed a specimen in which new bone had been deposited at many points, as a result of this process. This was a constant first effect, and new bone was always to be found, more in the lower than in the upper jaw. In a few, very few cases, the disease would stop here. Generally, however, the result was necrosis of the whole of the affected bone, and that, too, of the new bone as well as the old.

"In the case of removal of the greater part of the lower jaw, (the first case related,) the periosteum of the remaining part of the bone was inflamed, and probably to some extent the necrosed bone might be replaced by new bone.

"In a case of phosphorus necrosis, it was difficult to say, when once begun, how it would end. In some a limited part of the bone would separate, but in others the whole substance of the maxilla would become necrosed. Mr. Paget had observed that the patients were much disordered in health, but he would not venture to say that there was a special cachexia in this disease. There was, however, much more cachexia than was usual in local disease to that extent. The patients were peculiarly pale, sodden-looking, and exceedingly feeble. They were not thin, but looked as if the blood were deficiently red. There was generally also some bronchitis. It was a matter of inquiry whether the phosphorous acid acted as a poison in the blood—the necrosis being the local manifestation of it.

"An important question was: Could the disease, by proper care, be entirely prevented? In some conditions of perfect ventilation, and great care as to the condition of the mouth in those exposed, no doubt it could. Since 1847, in the manufactory at Nuremburg, only one case had occurred in fourteen years. This improvement was due to perfect ventilation, great cleanliness, and inspection of the teeth. It is while dipping the matches that exposure to the fume occurs. It is necessary that the fumes should, as much as possible, be blown away from the workman. No one with broken teeth, gumboils, etc., should be allowed to work at dipping the matches.

"The allotropic phosphorus does not fume, and thus, so far as the health of the workmen is concerned, it is better. It is, however, more expensive, and more liable to take fire. It is to be regretted, Mr. Paget said, that similar regulations to those in the German manufactories are not adopted in England.

"In treating this disease when established, we ought of course to advise removal from the influence of the fumes, fresh air and good diet, and thus hope to limit the necrosis. Is it advisable, when the necrosis is limited, to cut it out? Mr. Paget believed it was; but it was necessary to be cautious in taking for granted that the necrosed part was the only part diseased. There might be periostitis, the earlier stage of the disease, beyond, so that by the removal of the necrosed bone it is not clear that we should relieve.

"After removal in these cases, the repair is very remarkable. In the case of the boy in Darker Ward, there was a very large quantity of new bone in the position of the ramus and body. Mr. Paget said that he had seen no case in this disease in which death had occurred, but it would sometimes prove fatal by exhaustion and the supervention of phthisis."

"*The Divisibility of Matter.*—It is curious to observe how purely conventional are the terms *large* and *small*, *great* and *little*, and how meaningless they are when they cease to have relation to matters of every-day experience to our senses. They are simply relative, and depend for their significance upon some artificial comparison instituted in our own minds, which has no connection whatever with the absolute amount of substance regarded in the abstract. The same quantity may thus appear very large or very small, according to the way in which it is viewed and the size of the bodies with which it is mentally associated; thus, a pound of any mineral may seem an insignificantly small quantity to the miner accustomed to deal with hundreds and thousands of tons; the same lump may appear a large cabinet specimen to the mineralogist, while, on the other hand, to the natural philosopher engaged in the detection of its various constituents by means of spectrum analysis, and working on thousandths of a grain, this weight becomes an enormous quantity. The same weight of different bodies likewise appears large or small, according to the scarcity or commonness of the material; thus, an ounce of diamonds would fall under the first denomination, while an equal weight of coal would be looked upon as a very small quantity. If, however, we cease to associate our ideas of any substance with the purely conventional qualities which it acquires by comparison with other bodies, the terms large and small will be found to be capable of infinite extension either way, until it becomes evident that in the physical universe the properties which they are supposed to represent have no existence, but are merely artificial distinctions called into being by the imperfections of our senses.

"We have been led into these reflections by some theoretical and experimental inquiries which have come under our notice respecting the constitution of matter; and some of the results obtained in the endeavor to ascertain the limits of mechanical divisibility of bodies are so curious, and illustrate so forcibly the above remarks, that we are induced to place them at once before our readers.

"The divisibility of matter is a subject which has been frequently treated of and reasoned upon; indeed, in most works on physics or chemistry, illustrations are given of the extraordinary degree of subdivision to which bodies may be brought by mechanical means. One of the best illustrations of this is to be found in Miller's 'Elements of Chemistry,' part I., page 4, where the author shows to what a minute state of division it is possible to bring the metal gold. All these illustrations have, however, stopped far short of the limit attainable by mechanical means, and indeed have been merely given to illustrate extreme subdivision without pushing the subject to its legitimate extent. The following experimental illustration shows what infinitesimally minute quantities the natural philosopher is capable of working with and rendering evident to the senses, (or rather sense, for sight alone can appreciate them,) and will also show how conventional are the ordinary ideas of magnitude.

"We will start with a sheet of gold leaf. This consists of metallic gold beaten out into a film of about the 1-282,000th of an inch in thickness, measuring 3·375 inches square, and weighing about the 1-5th of a grain. A single square inch, therefore, weighs 1-57th of a grain. Now, Faraday, in his beautiful researches on the relations of gold to light,* has shown that it is possible by chemical means to reduce this thickness very considerably, still preserving the metallic continuity of the film. This is readily effected by breathing on a clean plate of glass, and then gently placing it on a piece of gold-leaf; the latter will adhere to it, and, if distilled water be immediately applied at the edge of the leaf, it will pass between the glass and gold, and the latter will be perfectly stretched: upon now draining the water out, the gold-leaf will be left well extended, smooth, and adhering to the glass. If, after the water is poured off, a weak solution of cyanide of potassium be introduced beneath the gold, the latter will be gradually dissolved away, becoming thinner and thinner; but at any moment the process may be stopped, the cyanide washed away by water, and the attenuated gold film left on the glass. If toward the end, a washing be made with alcohol, and then with alcohol containing a little varnish, the gold film will be left cemented to the glass. By this means the thickness will have become reduced to about one-twelfth part of what it was originally, weighing (in round numbers) about the 1-600th of a grain to the square inch, and being only about 1-3,000,000th of an inch in thickness. The film in this condition, although consisting of pure gold, presents none of the ordinary appearances of the metal, being perfectly transparent, and resembling a delicate film of pale green varnish, more than a dense metallic body.

"Having now obtained a continuous metallic film of gold upon a plate of glass, (and that it is continuous and metallic has been amply proved by Faraday,) let us see how far it is possible to subdivide it by mechanical means. From an examination of Nobert's test plate, it will be seen that it is possible to rule lines with a diamond point on glass, so close together that upwards of 90,000 of them are comprised in the space of one inch. The apparent limit of vision in the best microscopes, as tested by De la Rue, Quekett, and Ross, does not, however, reach beyond lines separated the 1-80,000th of an inch. Let us, therefore, cut our square inch of gold on the glass plate, with lines this distance apart, and crossing each other at right angles. The whole inch will, therefore, be divided into 6,400,000,000 squares, each of which is capable of being distinctly seen under adequate microscopic power. What now is the weight of each piece? The square inch of gold weighed at the commencement the 1-57th of a grain. By the action of cyanide of potassium, it was diminished in thickness until it only weighed the 1-600th of a grain. • This has now been cut up into 6,400,000,000 separate pieces, each of which, therefore, weighs no more than the 1-3,840,000,000,000th of a grain; or, in other words, a single grain of gold—a fragment about as large as a good-sized pin's-head

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* "Experimental Researches in Chemistry and Physics," p. 394.

—has been divided into three billion, eight hundred and forty thousand million separate pieces, each distinctly visible to the eye!

"The mind is quite unable to attach any definite significance to these figures without artificial assistance, but it may, perhaps, enable our readers to form some faint idea of the minuteness of the subdivision, when we state that each square bears about the same proportion to the original grain of gold that a thimbleful of water does to a building five times the size of St. Paul's. How insignificant do our ideas of great and small appear in the contemplation of such overwhelming figures as these! In the eloquent words of Dr. Nicoll, 'Great and little, in truth, seem in creation alike terms expressing merely relation to us, and vanish in the universe of the infinite God.'"—*Chemical News.*

Annealing Temperature of Metals.—The following remarks upon this subject, from an article republished in the *Franklin Institute Journal*, from the *London Practical Mechanic's Journal*, possess much general and special interest in a practical point of view: "The fact is, the 'annealing temperature' has not been yet ascertained for any one metal, and all that is known about it is, that there is a fixed and rather narrow range of elevated temperature peculiar to each metal, without the limits of which, annealing does not take place, and that the absolute mean temperature for each metal seems to be greater in some proportion as the fusing temperature of the metal itself is higher. Platina, for instance, when hard from wire-drawing or lamination, is not annealed under an intense white heat; wrought iron at about a bright red; in some sorts, not before a yellow heat; copper, at a low cherry red; and when we come down to the metals of very ready fusibility, such as tin and lead, their annealing temperature appears to be so low that the *heat evolved* in them by conversion of mechanical force, in laminating or wire-drawing, is sufficient to keep them annealed, *i.e.* they *cannot be hardened* by such processes. It is this curious fact of molecular physics which affords the explanation of the circumstance well known to those engaged in the trades of rolling sheet lead, or 'drawing' lead pipes by the older methods, namely, that the rolling or drawing can be accomplished by a *less total expenditure of power* if performed fast than much more slowly. That is to say, the power demanded is a minimum when the pressure is sufficiently sharp to evolve the heat of annealing in the lead. Upon a like condition (with others not here in question) depends the curious process of forcing up in pure tin the patent collapsible vessels of Rand now so extensively in use for receptacles of oil colors, perfumes, etc.

"Baudrimont, a French chemist and physician, has published some most important researches (so far as they go) on annealing temperatures, which may be found in *Ann. de Chim. et Phys.*, tom. ix.; but as respects the *precise* temperature at which annealing takes place, he has only shown that within certain not very wide limits annealing may be produced if the temperature be long continued; but that there is one point at the highest end of the scale at which annealing takes place instantaneously. To ascertain this point rigidly for all our more important metals would be most desirable, and we would offer to the physical experimentalist some hints as to a method by which probably the investigation might be advantageously pursued.

"It has been proved by Magnus (*Ann. de Chim. et Phys.*, tom. xxxiv. 3 *ser.*) and verified by others, that no thermo-electric current can be produced by the heating of any part of a metallic wire, the whole length of which is in the same molecular condition, and its whole surface in the same state, *i.e.* all polished and free from oxide, etc.

"Magnus further ascertained that when one portion of the length of wire was *hard* as it came from the draw-plate, and another portion of it had been previously *annealed*, that then, when heat was applied at the point of junction of these respective portions, a thermo-electric current was produced, and gave large deflections with the galvanometer; and that the production of the current was due to a difference in molecular arrangement in the hard and in the annealed portions, and not merely to a difference in their conductivity of *heat.* This he ascertained by showing that annealed and unannealed wire were, in this respect, the same.

"If, then, we arrange a metallic wire or bar having segments as above, one portion hard, the other annealed, so that it shall pass through a gas flame or furnace, or metallic bath, or other means of heating at the juncture of the segments up to known temperatures, we should expect to find the deflections of the galvanometer increase steadily as the temperature of the bar or wire rises until the moment when such a heat is applied that annealing takes place in the *un*annealed segment of the wire. At this moment the thermo-electric current ceasing altogether, the needle will retrograde to zero, or to its original point before heat was applied. This occurrence will signal the accomplishment of the molecular change, and the temperature at the moment may be read off from the pyrometric instrument employed and placed in the flame or furnace. Many precautions, some probable difficulties requiring preliminary experiments to disentangle, will readily occur to the physicien, and with him we must leave the subject now. It would be out of place here for us to enter more fully into a purely experimental subject. We have, we trust however, pointed out to the practical man some at least of the sources of difficulty and uncertainty that appertain to his operations of 'shrinking on,' and in doing so indicated the road by which, with the help of the man of experimental science, he may extricate himself from them.

"At the commencement of this paper we put in words another class of molecular changes, in virtue of which tires, axles, cannon, and all things formed of metal are presumed, in course of wear and use, to become deteriorated, weakened, or destroyed, namely, crystallization produced by vibration. We shall reserve the consideration of this, however, to a separate article in a future number."

"*On the Antiseptic Properties of Ammonia.* By B. W. Richardson, M.D.; read before the Med. Soc. of London.—Dr. Richardson said that his earliest researches were directed to the study of the antiseptic properties of gases, and recalled attention to the communication he had made to the Society on this subject in 1850. His present inquiry and application of ammonia as an antiseptic commenced in 1858. His attention was then directed to the fact that the presence of ammonia effectually arrested the oxidation of various bodies, and even prevented the action of ozone. Believing that, by an extension of the same law, animal substances exposed to ammonia could be prevented from putrefaction, he kept blood and portions of tissues in contact with simple ammoniacal vapor, and with results which were most remarkable. Blood in an ordinary stoppered bottle, if charged with ammonia so as to give a faint ammoniacal odor, would retain its freshness and many of its properties for years. Animal structures in like manner placed, even so as to be massed together in bottles containing ammonia-vapor, would retain their freshness apparently for an unlimited time.

"Dr. Richardson now showed the following specimens: The lungs of a calf which he had used for lecture purposes for six months, and which had been simply placed under a bell-jar, a little ammonia in solution being put over them from time to time; a pancreas which had been kept for eighteen months in a bottle containing twenty minims of ammonia solution; a kidney showing deep congestion, which had been removed sixteen weeks; a bottle of mixed specimens, including portions of intestine with enlarged glands; a bladder, the inner surface of which was injected; an uterus and ovaries, and a pancreas, all of which had been preserved lying close in one bottle for six weeks; also a portion of liver which had been removed nearly three years, and a cancerous breast which had been removed by Mr. Spencer Wells eight weeks before. The specimens all retained their freshness, and admitted of dissection and examination, as in the recent state.

"The author then described the method of applying ammonia.

"It was necessary, in the first place, to trust to the ammonia alone; specimens that were exposed first to spirit, and then to ammonia-vapor, were always spoiled. For the preservation of fluids, such as blood or milk, it was merely necessary to add the alkali in solution, in proportion, say, of twenty minims of the strong solution to two ounces of the fluid to be preserved. For tissues, the plan was to place the specimen to be preserved in a stoppered bottle, or under a bell-jar, such as is used for wax flowers and ornaments; to place in the jar with the specimen a layer of felt or lint, charged with from ten minims to a drachm of the liquor ammoniæ fortior.; and then to close the vessel or jar securely from the external air. For a luting in such cases, soap answered best, or a mixture of soap and red-lead.

"After this description, Dr. Richardson pointed out the practical value of the method. First, in conducting post-mortem inquiries, it did away with all occasion for hurry. It was now only necessary at an autopsy to be provided with one or more jars, each containing, say, a drachm of liquid ammonia. The jars might now be filled with specimens; and, if the stoppers were put in with care, the specimens would retain their freshness for weeks, and even their microscopical characters. The only peculiar change was, that if much fat were present, the alkali formed with it a kind of soap —a fact which explained the formation of adipocire in the dead subject undergoing slow decomposition. For forensic purposes, this method of preserving animal structures was perfect, inasmuch as it added no mineral or poisonous matter, and yet secured the part to be examined free from change and from all offensive odor. Not only so, but important pathological changes, such as ulceration of intestine, could be kept under observation and submitted to any number of pathologists. Dr. Richardson had found the system a very useful one, too, for lecture purposes, as it enabled him to show to his class real specimens of disease, such, for instance, as the scirrhous breast, instead of casts, or specimens softened, discolored, and, indeed, destroyed altogether, by immersion in spirit.

"The last point to which Dr. Richardson drew attention was the cause of the antiseptic power of ammonia. Ammonia, being a product of decomposition, had been looked on commonly as a substance provoking decomposition. But ammonia was truly the most powerful antiseptic known: it acted catalytically, by preventing the union of oxygen with oxidizable bodies. An experiment was here performed, illustrating this. Half a grain of ammonia, diffused through forty cubic inches of air, was shown to possess the power of entirely suspending the combination of oxygen with potassium on a surface of paper saturated with iodide of potassium, starch, and solution of oxygen, so long as the paper was presented to the ammoniated air; but so soon as the paper was removed, the evidence of the combination, indicated by the formation of the blue iodide of starch, was presented. In preserving animal structures in ammonia the same experiment was virtually carried out; the presence of the ammonia suspends the oxidation. There were other agents which effected the purpose, such as chloroform; but the fact that these agents were indifferently soluble in water rendered them much less effective, as compared with ammonia, which combined readily with the water contained in the tissues, and so perfected the preservation of the minutest point.

"In conclusion, the results presented tended to throw a light on the influence of the ammonias, as the producing causes of some diseases, and as the curative remedies in other diseases. The same rule that pertained to dead pertained to living organic matter. Hence long exposure to ammoniacal vapor, by arresting oxidation, produced extreme anæmia and a low depraved condition of the system altogether, with reduced respiration, reduced appetite, reduced muscular power, and reduced energy. On the other hand, in cases where a rapid oxidation of the body was being determined, attended with increase of heat, and rapid disintegration of tissue, the administration of ammonia, by arresting these changes, became, in judicious hands, the most powerful and effective of remedies. It checked decomposition by its action on oxygen; it held the blood-fluid by its solvent power as an alkali; and, being volatile, it inflicted no immediate injuries on the structures of the body."—(*British Medical Journal* and *Dublin Medical Press.*)

"*Some Uses of Paraffin for Chemical Purposes.*—The price of paraffin keeps step with that of the other products of the distillation of coal, tar, and petroleum, and being now about as low as it will probably ever come to, there will not be wanting many important uses for it, especially in the chemical and pharmaceutical line. That it is acted on neither by chlorine, nor by caustic alkalies, nor by acids, has given to it its name, though it may be as well to notice that the non-action of oil of vitriol refers only to the pure article, and that inasmuch as all, or very nearly all, the paraffin sold here contains a certain proportion of stearic acid, which is added for some good and some bad reasons, it will be darkened more or less by the strong acid. Some of its applications, so far as we can call them to mind at present, we will mention. A great inconvenience in chemical analysis and other manipulations, is the use of oil or tallow, and metallic baths for obtaining constant temperatures higher than the boiling point of water and solution of salts—the fats, on account of the production of acrolein and similar unpleasant exhalations, and the metals, as well as the salts, by the formation of crusts of oxides, etc. on the surface. Paraffin, even when not altogether pure, will give any constant temperature up to 550° F., which can be kept up by a spirit-lamp or a gas-lamp, with a contrivance like Kemp's regulator, or those little gauze caps on Bunsen's burners. It fuses a little above 100° F. Glass vessels, when placed in the bath at that temperature, are not liable to crack; and if it should be spilled, it is not liable to grease everything that it touches. The vessel used as a bath is also very readily cleansed with benzole.

"Filtering paper drawn through melted paraffin, left in contact with oil of vitriol, does not change. Labels on acid bottles, after being covered with a gloss of mucilage and dried, are painted over with a coat of paraffin heated somewhat above its freezing point, so as not to give too thick a coating.

"Hydrofluoric acid may be kept in glass bottles coated on the inside with paraffin, which coating is formed by rinsing out the dry, warm bottle with paraffin, and chilling it with proper care.

"In place of waxed paper, we know no better substitute for the purpose of covering jars and other like uses, and we should not be surprised to see it come largely in use for preserving fruit, eggs, etc., by giving it a coating sufficient to prevent the action of the atmosphere. Kobell quite lately found a novel application for paraffin, in analysis for excluding the atmosphere from oxidizable solutions, such as ferrous salts, while they are manipulated. Instead of in an atmosphere of hydrogen or carbonic acid gas, a ferric solution, for instance, is placed in an open dish or beaker in contact with metallic zinc and acid, and covered with a stratum of paraffin, enough heat being applied to keep the latter fluid. Since it has no action on the permanganic solution, the whole may be afterward tested in a beaker without hindrance.

"Mohr has for years used paraffin as a protection for corks that are not to be exposed to a higher temperature than the common, but to caustic alkalies and acids. The corks, well selected, are soaked in the melted paraffin as they would be in water. For glass-stoppered alkali bottles, it is likewise an excellent preventive for the fastening of the stoppers and irremediable losses.

"Many other applications will suggest themselves to the practical chemist, and we shall be glad to hear more of its application in such and other directions."—(*American Druggists' Circular.*)

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"*Recent Researches on Metallic Amalgams, and on the Origin of their Chemical Properties.* By M. J. REGNAULD.—In a preceding work I have shown that the chemical properties of amalgamated zinc and cadmium are connected with the thermic phenomena which take place at the moment when these two bodies are united to mercury. My recent investigations tend to generalize these relations. These investigations extend over a considerable number of metals, and prove that, by the fact of amalgamation, some, such as zinc, rise in the scale of positive affinities, while, on the contrary, others, such as cadmium, are lowered.

"Among the metals submitted to these comparative experiments, the following, when allied to mercury, become electro-positives: iron, nickel, cobalt, zinc, tin, antimony, copper, lead, bismuth.

"Among these bodies, only zinc, tin, and lead combine with mercury by simple contact, and without auxiliary chemical or physical action. I have ascertained that during the amalgamation of tin and lead, and likewise zinc, the temperature is not lowered. Thus, then, in all three cases where the temperature can be observed during the reaction, it is found that the positive affinity of the compound augments when the heat of its constitution increases.

"Hence, it may be concluded that other amalgamated metals, having identical properties, owe them to the same cause. Let me add that a comparison of their latent heat of fusion, and of the chemical rank they hold, is very favorable to this point of view. It is easy to be convinced of this by examining the table in which the latent heat of fusion of the metals experimented upon are shown. Some are exact, and are the result of calorimetric determinations; others have only approximate vapors, deduced from the relation established by M. Person between latent heat, the co-efficient of elasticity, and the density of the metals.

	Latent heat of fusion.	
Iron	64·171	Calculation.
Nickel	55·397	"
Cobalt	51·633	"
Zinc	28·130	Experiment.
Tin	14·252	"
Antimony	12·455	Calculation.
Copper	33·881	"
Lead	5·369	Experiment.
Bismuth	12 640	"

"The affinity of the first three metals of the table with mercury differs very slightly from that of zinc; and as their latent heat is decidedly superior to that of zinc, the increase of positive affinity in the amalgams is due to this circumstance.

"The electro-chemical properties of the amalgamated metals placed below zinc are also explicable on the same principles. In fact, if on the one hand their latent heat is generally inferior to that of zinc, on the other hand they unite with mercury in virtue of so feeble an affinity that the formation of the alloy lowers the temperature, as is the case with tin and even with lead.

"As to the metals analogous to cadmium which disengage heat during amalgamation, and which, according to theory, ought to be lower in the scale of affinities, their place in the group of metals is, through their electro-positive property, far removed from mercury. Their combination with mercury is the consequence of an energetic affinity, and as their fusing heat seems otherwise to be feeble, the heat produced during the reaction is of remarkable intensity.

"Potassium and cadmium, the amalgamation of which is attended with the production of heat to the extent of incandescence, have suggested to me a new bearing of these ideas. Experiments, with results as precise as they are unvarying, have proved that the amalgams of potassium and sodium, formed by these powerful affinities, are negative relatively to pure metals. They present, then, the extreme limits of chemical and thermic phenomena as presented by cadmium. These phenomena will certainly be met with again in various metals of the first sections, the properties of which have been but imperfectly appreciated.

"From these researches the following deductions may, in conclusion, be drawn:—

"When a metal is amalgamated, its position in the scale of affinities undergoes some modification. The result may be in the contrary direction even for allied metals, for it depends both on the chemical function of the metal and on its latent heat of fusion.

"If the temperature is lowered during the combination of the metal with mercury, if, consequently, the constitutional heat of the amalgam is greater than that of the metal, the latter is raised in the order of positive affinities.

"When all the thermic phenomena are inverse, when heat is disengaged during the formation of the alloy, the amalgamated metal is negative, in relation to the free metal."—(*Comptes Rendus* and *Chem. News.*)

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India-Rubber.—In the report of the proceedings of the Polytechnic Association of the American Institute, in a cotemporary, it is stated that Professor SEELY made the following remarks in relation to this substance: "When India-rubber was first introduced we thought that it would answer for all purposes. I proposed, myself, to use it as a steam engine in the form of a bellows. But we soon discovered that its properties were destroyed by the action of many substances, spirits of turpentine, acids, etc., and they were altered by changes in temperature and by the action of the air. I procured a very pure sample as white as milk, but the surface soon became dark, and its tenacity was destroyed. It could be scraped off with a knife; it absorbed oxygen and was changed into a resin, like some other hydrocarbons—spirits of turpentine for instance, which becomes first oil of turpentine and then solid rosin.

"When the art of vulcanizing was discovered it was thought at first that all of the difficulties were overcome. But experience has shown that vulcanized rubber is acted upon by all the agents which affect the crude material, only in less degree, or more slowly. It becomes stiff in the cold, it is softened by heat, is dissolved slowly in spirits of turpentine and benzole, is spoiled if kept any considerable time in contact with grease, and is changed into resin by absorbing oxygen from the atmosphere. But all of these changes go on much more slowly in vulcanized rubber than in the crude material.

"There is another difficulty with vulcanized rubber—that is, the adulteration. Perhaps there is no other manufacture in which adulteration is so systematically and extensively practiced as in that of India-rubber. Some of the articles in market do not contain 10 per cent. of rubber. Notwithstanding these depreciatory remarks, I regard India-rubber as a very valuable substance. I should almost agree with Liebig in the opinion that the four most valuable materials for the chemist—naming them in the order of their importance—are glass, platinum, cork, and India-rubber."

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"*Clastic Anatomy.*—There are a series of anatomical and physiological models in the French galleries of the International Exhibition which present features well worthy of notice. They include an extensive collection of models of the organs of men and animals, fishes and insects, which may easily be taken to pieces, and put together again, layer by layer, as in a veritable dissection. They are composed of a paste which, being run into moulds, receives from them the most delicate markings, and in drying acquires an elasticity and solidity which surpass those of wood. They have a great many advantages: among them extreme durability and lightness; the possibility of removing successively, one by one, all the parts, as an able dissector would for demonstrating, and of replacing them with the same facility; the possibility of reproducing, in enormously enlarged proportions, organs and details which could not be seen by the naked eye, or could not be demonstrated to a class. In our schools, the use of these models might be adopted with the effects of abridging for the most industrious student the time employed for learning anatomy, and of diminishing the number of subjects requisite for dissections; for although dissection must always be quite indispensable, some unnecessary work may be saved if the students study first the forms and relations of the organs on pieces such as these, or use them to refresh their memory. In lecturing to a class on such parts as the internal ear, the lecturer will derive the most sensible aid from being able to show the very beautiful and greatly-enlarged models which are here displayed."—(*Lancet.*)

"*Root of a Canine Tooth lodged in the Thickness of the Lower Lip, simulating a Cancerous Tumor.*—M. LANDYCK, of Dunkirk, has published this case, referring to a lady, forty years of age. She had always suffered with her teeth, and had but a few incisors left; the rest of the jaws presenting roots more or less firmly wedged, and alveoli more or less decayed. Toward the end of the year 1854, she felt a small tumor forming in the lower lip on the left side, which tumor soon filled the space below the internal aspect of the lip and the gum. Pain was subsequently experienced, and a few months afterward the patient could hardly eat. She sent for M. Landyck, who discovered a large tumor situated as above described, and ulcerating. Ablation was not proposed, as the lady was very nervous, and cauterization was resorted to. In the mean while parturition took place quite normally, and while using the caustic some time afterward, M. Landyck felt a hard substance in the tumor; by then making a crucial incision, he discovered a long root of the canine tooth, covered with a thick layer of calcareous matter. It was placed horizontally, the apex turned toward the lip, and its upper part adhering to the bone. This root being removed, the tumor disappeared, and the patient was freed from all uneasiness."—(*Ibid.*)

"*Nævus situated upon the Inner Surface of the Left Cheek; Excision.* (Under the care of MR. LAWRENCE, St. Bartholomew's Hospital.)—While nævi are commonly observed about all parts of the skin of the face, head, neck, and trunk, they are rarely met with in the mucous membrane of the interior of the body. Occasionally they are seen in the lips, and oftentimes involve the skin and mucous membrane together. They have been known to invade the lining of the cheeks, and an instance presented itself at this hospital on the eighth instant, in the person of a healthy-looking young country girl. A distinct vascular tumor of the size of an almond was present on the inner surface of the left cheek, and had been noticed for a long time; it had increased somewhat latterly, and was most inconvenient. Mr. Lawrence laid hold of it with a pair of forceps, raised it from the surrounding mucous membrane, and cut it off with scissors. It bled freely, as was expected; but as it was completely excised, a permanent cure is anticipated."—(*Ibid.*)

"*On the Preparation of Silicium.* By Captain CARON.—A mixture is made of—

Dried silico-fluoride of potassium	300
Granulated zinc	400
Sodium, in small pieces	80

"These proportions are not absolutely necessary, but they seem to give the best yield of silicium. The mixture thus made is projected into a crucible, which, along with its cover, is red-hot. The reaction is brisk, although, when the cover is not sufficiently hot, it is often necessary to press the mixture with a clay pipe. When the whole is liquid, the crucible is removed and allowed to cool. It is necessary to execute the operation as rapidly as possible, otherwise the crucible is liable to be perforated and part of the zinc and silicium lost.

"The cooled crucible is broken to extract the ingot of zinc, which will have settled down well if the operation has been successful; the crystallized silicium is almost entirely at the upper part of the zinc. The pieces of the crucible and scoriæ adhering to the regulus are removed, and the latter is melted at as low a temperature as possible, so that the zinc is liquid while the silicium is solid. The zinc is run out and granulated, and can be used for another operation; crystals of silicium remain in the crucible surrounded by a little zinc. This residue is treated with concentrated hydrochloric acid, which removes zinc and iron, and crystallized silicium is left still containing a little lead, (if the zinc was not quite pure,) and always a little protoxide of silicium. The lead is removed by boiling with strong nitric acid and washing, and the protoxide of silicium, as well as any of the mass of the crucible, are removed by treatment with hydro-fluosilicic acid. The pure silicium which remains is washed with water and dried.

"To melt this silicium, it is mixed with silico-fluoride of potassium and placed in a double crucible, having been previously covered with a thick layer of coarsely-powdered glass. It is next heated to the melting-point of iron for some time, and is then immersed, while hot, in cold water, in order to render the glass more friable. The crucible is then carefully broken, and the globule of silicium is found surrounded by glass, which is easily removed either by a hammer or by means of a sharp-pointed steel. To purify it completely, it must be boiled for some time with concentrated hydro-fluoric acid, which completely removes any slag, provided it is not in the centre of the regulus.

"The only acid which attacks melted or crystallized silicium is nitro-fluoric acid."—(*Phil. Mag. and Ann. de Chim. et de Phys.* and *Chem. News.*)

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"*Composition for Cleaning and Polishing Metals and Glass.* W. Clark, Chancery Lane, London. A communication. Dated June 8, 1861. (Not proceeded with.)—The inventor prepares a composition, which he terms 'brillantine,' according to the formula undermentioned: An extract of guano is obtained in the first instance by boiling that substance with water, and concentrating the liquor until it furnishes a pasty crystalline mass on cooling. Of this material he takes 100 parts by weight, of calcined Tripoli powder, 25 parts; of flour, 12 parts; and common salt, 10 parts. The whole is warmed, intimately mixed, and formed into a homogeneous paste, which is allowed then to cool and harden. If to be used for polishing metals, the composition is diluted with spirit; but for cleaning glass, and common purposes, water is sufficient.

"The special efficacy of the guano compound may be traced to the hard nature of the crystallized urates which separate during the concentration of the extract. It is probable that for the same reason crude tartar would answer the purpose equally well. The advantage of employing chloride of sodium for polishing metals is open to question, but for cleaning glass a solution of common salt alone has frequently been employed."—(*Chem. News.*)

MISCELLANY.

In a recent discussion before the Royal Medical and Chirurgical Society of London, "On the Tactile Sensibility of the Hand," **Dr. Kidd** observed (*Lancet*) that "the plan of ascertaining the amount of sensibility by means of compasses had been extensively tried by the late Dr. Todd, and the results obtained were often very valuable. The hand and forearm were, Dr. Kidd said, more sensitive than other parts of the body, and hence he had found that dashing cold water on these parts was more efficient in rousing a person from the effects of chloroform than throwing cold water on the face. It might be, he said, on account of the more intimate connection the nerves of the brachial plexus had with the nerves of the thoracic viscera."

The *Lancet* says that for the preparation of a convenient and portable styptic, "it is recommended by the *Moniteur des Sciences Médicales* to soak amadou or German tinder in a solution of perchloride of iron of a density of about 1·250. It should then be dried in the sun, and rubbed between the hands to restore its suppleness and porosity. Small pieces applied to leech-bites soon stop their bleeding. They may be held in their places by strips of plaster." This plan may be of general application with mechanical and chemical styptics.

In the report of the proceedings of the King's County Medical Society (*American Medical Monthly*) it is stated that in relation to the reproduction of bone, **Dr. Enos** said: "It is well established that the various parts of the bone produce bone; thus, not only the periosteum, but the endosteum and the medullary matter. French writers have shown that if the periosteum is raised from the bone and carried into the belly of a muscle, it will produce bone in its new situation. Dr. Enos had repeated this experiment upon the femur of a rabbit, with like result. The soft parts will also, under certain circumstances, throw out ossific matter. Dr. Enos had a case where the fractured ends of a bone had been separated for more than an inch, and union had taken place where the new bone must have been thrown out by the muscles."

The following report of an interesting case treated in the Children's Infirmary, Liverpool, is given by **Dr. Williams** in the *Medical Times and Gazette:* "Thomas R., ten years of age, was admitted on July 24, 1861, for epulis. It was about the size of a marble, situated between, and overlapping, the bicuspids of the right lower jaw. I removed, on the day of admission, as much as could be got at without extracting the teeth. Hæmorrhage checked by tinct. ferri. mur. Chloride of zinc was applied to a small red spot which appeared afterward between the teeth. This not sufficing, the second bicuspid was extracted, and again the zinc tried. The result not having been satisfactory, the first bicuspid was removed on September 9, and with this all appearance of the disease ceased.

"October 18.—The patient not having since made his appearance at the Infirmary, is considered cured."

The *American Druggists' Circular* has the following on the employment of alum for moulding: "Alum, slowly fused, to prevent foaming, and mixed with a little (one-thirtieth) nitre or salt, or sulphate of potassa, or gypsum, is recommended for moulding medals."

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